BERGEN'S BOTANY

KEY AND FLORA

NORTHERN AND CENTRAL STATES

REVISED AND ENLARGED

GINN & COMPANY

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NORTHERN AND CENTRAL STATES

BY

JOSEPH Y. BERGEN, A.M.

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GINN AND COMPANY

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PREFACE

This flora is a considerably enlarged revision of the one prepared by the author in 1901. It does not profess to describe all the conspicuous seed plants of any locality, but rather to comprise a large number of the most available spring-blooming species over an extensive region. More than a hundred species have been added to the list included in the older edition, mainly of plants which range westward to the moderately high plains. The little book may therefore afford a good deal of practice in the determination of species to secondary-school pupils in states even as far west as the Dakotas, Nebraska, Kansas, and Oklahoma. It extends south about to the southern boundary, of Kansas on the west and to that of Virginia on the east.

In the matter of nomenclature it seems best for those who do not wish to be hopelessly sectional to follow the rulings of the Vienna Congress. The author deems himself fortunate to have been able in this connection to avail himself of the decisions of the staff of the Gray Herbarium, as embodied in the seventh edition of Gray's *Manual of Botany*, and to get advice from the same source in regard to names of cultivated plants not described in the Manual. His most sincere thanks are hereby tendered for this invaluable assistance.

At the risk of sometimes seeming pedantic the writer has adopted the practice of discarding, for the most part, such unscientific expressions as "stemless plants," "radical leaves," "calyx adnate to the ovary," and several others. It is certain that if the plant descriptions which contain such terms were now being framed for the first time on the basis of present-day morphology, these terms would not be used.

Most of the plants here described bloom before the end of the school year, and it is believed that all of those which occur toward the southern limits of the territory covered will be found to flower there considerably before the end of June. It

may be found worth while, in the case of some *Umbelliferæ*, *Boraginaceæ*, and *Compositæ*, to collect fruit during the summer before it is to be used, preserve it either dry or in preservative fluid, as may seem best, and use it with freshly collected flowers in the determination of species.

No systematic work with seed plants can be of much use unless the teacher takes constant pains to bring out the idea of actual relationship by descent among the forms studied, and to show, in the simpler cases available, some of the steps of evolution. The beginner must not be allowed to suppose that the flora which he is using contains more than a small fraction of the total number of plants even in the families treated. He must be made to realize that the *Rubiaceæ*, for instance, of which he has fourteen species described, really number as many as 4500 species, and the *Compositæ*, instead of mustering a few dozen strong, number in all at least 12,000 species. For such comparisons Engler's *Syllabus der Pflanzenfamilien* will be found to contain the most recent and compact summary.

A somewhat complete (phanerogamic) flora of the student's region should be constantly in use. For this purpose the author prefers to all others the seventh edition of Gray's *Manual of Botany*. For the convenience of those who may find it necessary to use Britton's *Manual of the Flora of the Northern States and Canada*, the generic name used by Britton will generally be found in parenthesis after the name sanctioned by the Vienna code. In cases where Britton's genus covers only part of the genus as given in this book, a statement to that effect is made, as on p. 186, — B. Fl. species 4 (*Naumburgia*). For suggestions about literature see Bergen and Davis, *Laboratory and Field Manual of Botany*, p. 230.

The novice should find a good deal of help in understanding the structure of some of the more difficult flowers and fruits in the illustrations which accompany several families. Most of these have been redrawn for the present edition by Mr. E. N. Fischer of Boston.

J. Y. B.

CAMBRIDGE, MASSACHUSETTS

HOW TO USE THE KEY AND FLORA

In order to determine an unknown species, the student is first to make a careful examination of the plant in hand. After noting in a general way the appearance of the root, stem, and leaf, including a cross section of the stem, he should study the number of the parts of the flower, then make and draw a cross section and a lengthwise section of it. The kind of symmetry of the calyx and corolla, peculiarities in the shape, structure, or operation of the essential organs, such, for instance, as anthers discharging through chinks in the end, should be noted.

Next, the inquirer should look carefully through the key to the families. He is first to decide whether the plant in question is a Gymnosperm or an Angiosperm; if not a coniferous tree or shrub, it will of course belong to the latter division. He is then to settle the question whether it is a Monocotyledon or a Dicotyledon; then under what division of the group the plant comes; and, finally, to decide upon its family.

Turning now to the page at which the family is described, a rapid inspection of the characteristics of the genera will make it evident to which one the species under examination belongs. It may not infrequently prove that none of the genera described agree with the plant studied, and in that case the student must either consult a larger flora or rest satisfied with having determined the family to which his specimen belongs. The identification of the species, after

the genus has been reached, presents no difficulty in a little flora like the present one.

A single example may suffice to illustrate more in detail the manner of determining species. Suppose the student to have in hand a flowering specimen of lily of the valley. Turning to the key, page 5, it is evident from the statements concerning Gymnosperms that the plant does not belong under that head. Under Angiosperms it is clear, from the numerical plan of the flower (in threes) and the parallel-veined leaves, that the plant is a Monocotyledon. Among Monocotyledons three general groups are designated by as many numbers in parenthesis. The flower in hand belongs under (3) "Flowers not on a spadix." Under this head the choice is first between (*a*) "Carpels numerous and separate" and (*b*) "Carpels united." In the lily of the valley they are united. The next choice is between "* Perianth hypogynous" and "** Perianth not hypogynous." This flower is hypogynous. The families with hypogynous perianth are grouped under three divisions (distinguished by †, ††, ††† respectively), and of these the last, with its "Perianth actinomorphic, its divisions all alike or nearly so, petal-like," corresponds to the flower under examination and refers the student to "10. Lily Family, page 6." Turning to the key to the genera of the Lily family, page 31, two subfamilies are found. Since the plant is not a climber it belongs to "Subfamily I. Liliaceæ Proper."

This subfamily is divided into five groups designated by capital letters. The lily of the valley has an undivided style and springs from a rootstock, therefore it belongs to group B. Reading the descriptions under B, none is found to agree with the plant in hand until the next to the last is reached: "Leaves only 2, directly from the rootstock. Flowers in a raceme, bell-shaped, white, sweet-scented, *Convallaria*."

Referring now to the genus, it is found that there is only one species and that one agrees with the specimen in hand. It is therefore *Convallaria majalis*, and the name (as indicated by the L. which follows it) was given by the great Swedish naturalist, Linnæus.[1]

The author does not believe in spending much of the school time of a class upon identifying species, but would rather recommend comparative studies of as many plants of a group as are accessible, and making these studies thorough enough to bring out fully the idea of the family, the genus, and the species.[2] The descriptions in this flora may be used as a check on the cruder ones which the pupil is first to frame for himself.

[1] It will greatly simplify matters if the teacher throughout selects for examination only such species as are described in the flora.

[2] The teacher will find abundant suggestions for such a course in Spalding's *Introduction to Botany*, pp. 152–260.

KEY TO THE FAMILIES OF FLOWERING PLANTS DESCRIBED IN THIS FLORA

CLASS I

GYMNOSPERMS. Ovules not inclosed in an ovary.

Trees or shrubs. Leaves usually evergreen and needle-shaped, awl-shaped, or scale-like. Flowers monœcious or diœcious. Fruit a scaly cone, or sometimes appearing berry-like. 1. Pine Family, page 13

CLASS II

ANGIOSPERMS. Ovules inclosed in an ovary.

SUBCLASS I. — MONOCOTYLEDONS. Flowers usually with their parts in threes, never in fives. Leaves usually parallel-veined. Cotyledon 1.

	Family	Page
(1) Flowers inclosed by chaffy bracts.		
Flowers 2-bracted. Leaves 2-ranked. Stem cylindrical	4. Grass	22
Flowers 1-bracted. Leaves 3-ranked. Stem triangular	5. Sedge	23
(2) Flowers on a spadix.		
Spadix slender, hairy, and bristly	2. Cat-Tail	20
Spadix fleshy	6. Arum	24
(3) Flowers not on a spadix.		
(*a*) Carpels usually numerous and nearly or entirely separate	3. Water Plantain	21
(*b*) Carpels united.		
* Perianth hypogynous or nearly so.		
† Perianth actinomorphic, its parts similar, green, or chaffy	9. Rush	30
†† Perianth of 2 sets, one sepal-like, the other petal-like.		
Style and stigma 1. Petals 3 or 2, soon disappearing	7. Spiderwort	26

	Family	Page
Styles or stigmas 3, separate. Petals 3, lasting several days. Leaves netted-veined . .	10. (*Trillium*) Lily .	30
Style 1, stigma 3-lobed or 6-toothed. Corolla not actinomorphic. Aquatic herbs with parallel-veined leaves	8. Pickerel Weed .	28
††† Perianth actinomorphic, its divisions all alike or nearly so, petal-like	10. Lily	30
** Perianth not hypogynous. Anthers 6	11. Amaryllis . .	43
Anthers 3	12. Iris	45
Anthers 1 or 2	13. Orchis . . .	47

SUBCLASS II. — DICOTYLEDONS. Flowers usually with their parts in fives or fours. Leaves netted-veined. Cotyledons 2.

I. Apetalous Division. Flowers without a corolla or without either calyx or corolla.[1]

A

Flowers monœcious or diœcious, one or both sorts in catkins.		
(1) Staminate flowers in catkins, the pistillate ones solitary or clustered. Leaves pinnately compound	16. Walnut . . .	52
Leaves simple	18. Beech	58
(2) Both kinds of flowers in catkins. (*a*) Leaves alternate. Ovaries in fruit becoming fleshy and combining into an aggregate fruit . . .	20. Mulberry . .	64
Fruit 1-seeded, a drupe or minute nut. Aromatic shrubs	15. Bayberry . .	51
Fruit a capsule, seeds with silky hairs . .	14. Willow . . .	48
Fruit a minute nut or akene. Mostly large shrubs or trees, not very aromatic . .	17. Birch	54
(*b*) Leaves opposite, small parasitic shrubs . .	23. Mistletoe . . .	68

B

Flowers not in catkins, both calyx and corolla wanting	45. Sycamore . .	113

[1] When only one floral envelope is present, this is said to be the calyx and the corolla is considered to be missing.

C

Flowers not in catkins; calyx present, sometimes petal-like.

	Family	Page
(1) Trees or shrubs.		
Flowers not hypogynous; plants not climbing	74. Dogwood	175
Flowers not hypogynous; climbing plants	24. Dutchman's Pipe	68
Flowers hypogynous.		
Style single, not cleft, fruit a key (*Fraxinus*)	79. Olive	189
Style single, not cleft, fruit a drupe	38. Laurel	95
Styles 2 or 2-cleft, fruit 1-celled	19. Elm	62
Styles 2 or 2-cleft, fruit 2-celled	59. Maple	151
Styles 3, each 2-cleft. Ovary 3-celled	54. Spurge	145
(2) Herbs.		
Flowers not hypogynous; ovary 6-celled	24. Dutchman's Pipe	68
Flowers not hypogynous; ovary 1-celled; flowers in umbel-like clusters	22. Sandalwood	67
Flowers hypogynous.		
(*a*) Ovary 1-celled.		
Stamens many	33. Buttercup	83
Stamens few.		
Stipules sheathing the joints	25. Buckwheat	69
Stipules wanting.		
Rather fleshy herbs	26. Goosefoot	72
Not fleshy.		
Ovules on a free central placenta; delicate, soft-leaved herbs. (*Stellaria*)	31. Pink	77
Ovule single, coarse herbs	27. Amaranth	74
(*b*) Ovary several-celled.		
Small prostrate herb; leaves spatulate, whorled	29. Ice Plant	76
Stipules present, not sheathing.		
Style single	21. Nettle	66
Styles 2	20. Mulberry	64
Flowers hypogynous, ovary 3-celled	54. Spurge	145
Flowers hypogynous, ovary 5–10-celled; fruit a berry	28. Pokeweed	75

II. Choripetalous Division. Calyx and corolla both present, the petals not united.

A

Stamens more than 10.

	Family	Page
(1) Trees, shrubs, or woody vines.		
(*a*) Leaves alternate.		
* Ovary 1, simple.		
Fruit a drupe	46. Rose	113
** Ovary 1, compound; fruit dry.		
Ovary 5-celled, 1-2-seeded at maturity	64. Linden	157
Ovary 3-celled, many-seeded	69. Begonia	164
*** Ovary 1, compound; fruit fleshy	46. Rose	113
**** Ovaries numerous.		
† Leaves with stipules.		
Stamens inserted on the receptacle	35. Magnolia	92
Stamens many, monadelphous	65. Mallow	158
Stamens inserted on the calyx	46. Rose	113
†† Leaves not with stipules.		
Small trees	37. Papaw	94
(*b*) Leaves opposite; fruit dry.		
Ovary single, 3-5-celled	44. Saxifrage	109
Ovaries several, inclosed by the calyx tube	36. Calycanthus	94
(2) Herbs.		
(*a*) Ovary single, simple; fruit a berry	34. Barberry	91
(*b*) Ovaries several, simple.		
Stamens inserted on the receptacle	33. Buttercup	83
Stamens inserted on the calyx	46. Rose	113
(*c*) Ovary compound.		
Aquatic herbs, leaves flat	32. Water Lily	82
Marsh herbs, leaves tubular	43. Pitcher Plant	108
Terrestrial herbs.		
* Ovary 1-celled.		
Placentæ central, juice watery	30. Purslane	76
Placentæ parietal, juice milky or colored	39. Poppy	96
Placentæ 2, parietal	41. Caper	107
Placentæ 3 or more, parietal.		
Leaves alternate	42. Mignonette	108
Leaves opposite	66. St. John's-wort	160
Leaves apparently wanting; stems fleshy	70. Cactus	166
** Ovary several-celled; stamens monadelphous	65. Mallow	158
*** Ovary 3-celled; stamens not much if at all monadelphous; stems fleshy, juice acid	69. Begonia	164

B

Stamens not more than 10.

	Family	Page
(1) Trees, shrubs, or woody vines.		
(*a*) Fruit a drupe.		
Stamens 2, rarely 3–4	79. Olive	189
Stamens as many as the petals.		
Flowers bisexual.		
Stamens 4, alternate with the petals	74. Dogwood	175
Stamens 5, alternate with the petals	55. Sumac	148
Stamens 4–5, opposite the petals	62. Buckthorn	154
(*b*) Fruit a berry.		
Stamens alternate with the petals.		
Inserted on the calyx, leaves simple	44. Saxifrage	109
Inserted on a disk surrounding the ovary; leaves compound	72. Ginseng	169
Stamens opposite the petals	63. Grape or Vine	155
(*c*) Fruit a 2-seeded capsule or a key.		
Leaves compound	52. Rue	144
(*d*) Fruit a 2-celled, many-seeded capsule; flowers large, yellow	79. Olive	189
(*e*) Fruit a 3–5-celled capsule; flowers small, greenish, or brown-purple; leaves simple	57. Wahoo	150
(*f*) Fruit 5-lobed, the 5 carpels separating when ripe; flowers rather large, white, or of showy colors; leaves simple	48. Geranium	140
(*g*) Fruit a 1–3-celled capsule, leaves compound, flowers zygomorphic	60. Buckeye	152
(*h*) Fruit a 3-celled bladdery capsule, leaves compound, flowers actinomorphic	58. Bladder Nut	151
(*i*) Fruit a legume	47. Pea or Pulse	126
(2) Herbs.		
(*a*) Ovary single, 1-celled, simple or compound.		
* Corolla actinomorphic or nearly so.		
Sepals and petals 4–5; stamens 5, 10, or 12, distinct.		
Leaves alternate.		
Stigma single	47. Pea or Pulse	126
Stigmas 4 or 2	44. Saxifrage	109
Leaves opposite, punctate, flowers yellow	66. St. John's-wort	160
Leaves opposite, flowers white or red	31. Pink	77
Sepals and petals 4–5; stamens 5, united	68. Passion Flower	163
Sepals 2, petals 4–5	30. Purslane	76

	Family	Page
Sepals 6, stamens hypogynous, opposite the petals	34. Barberry	91
** Corolla zygomorphic.		
Fruit a legume	47. Pea or Pulse	126
Fruit a capsule.		
Stamens 5	67. Violet	161
Stamens 6, in 2 sets	39. Poppy	96
(*b*) Ovary single, 2-5-celled, fruit usually dry.		
* Ovary 2-celled (or 2 carpels nearly separate).		
Flowers in umbels, stamens 5	73. Parsley	170
Flowers not in umbels, petals 4 or 0, stamens 6	40. Mustard	99
Flowers not in umbels, petals 5, stamens 10	44. Saxifrage	109
Flowers not in umbels, petals 3, stamens 6 or 8	53. Polygala	145
** Ovary a 4-celled capsule	71. Evening Primrose	168
*** Ovary of 3 nearly distinct lobes, which become thick and fleshy in fruit	50. Indian Cress	142
**** Ovary a 5-celled capsule.		
† Leaves simple.		
Parasitic white or yellowish herbs, or evergreen herbs, not parasitic, capsule many-seeded	75. Pyrola	177
Terrestrial, not much if at all fleshy, capsule 5-10-seeded	48. Geranium	140
Terrestrial, stem fleshy and translucent, capsule elastic, several-seeded	61. Balsam	153
†† Leaves of 3 leaflets	49. Wood Sorrel	142
(*c*) Ovary of 5 principal cells, each more or less divided by a partition into 2 cells; seeds flattish, with a mucilaginous coating	51. Flax	143
(*d*) Ovary single, 2-5-celled; fruit a berry	72. Ginseng	169
(*e*) Ovaries 2, seeds hairy-tufted	82. Milkweed	194

III. Sympetalous Division. Calyx and corolla both present, the petals appearing more or less united.

(1) Trees, shrubs, or woody vines.

(*a*) Leaves alternate.

* Fruit splitting open.		
Fruit a legume	47. Pea or Pulse	146
Fruit a 5-celled capsule	76. Heath	179
** Fruit not splitting open, a drupe	56. Holly	149
*** Fruit a berry.		

	Family	Page
Ovary superior; seeds few, large	78. Ebony	188
Ovary superior; seeds many, small	89. Nightshade	214
Ovary inferior	76. Heath	179
(*b*) Leaves opposite.		
* Fruit a 2-celled, 2-seeded capsule	95. Madder	227
** Fruit a 2-celled, many-seeded capsule.		
Seeds large, winged	91. Bignonia	222
Seeds not winged except in *Diervilla;* shrubs	96. Honeysuckle	230
*** Fruit a 5-celled capsule	76. Heath	179
**** Fruit a drupe or berry.		
Fruit 1–2-seeded (in *Forsythia* many-seeded); stamens 2	79. Olive	189
Fruit 1–4-seeded; stamens 4	87. Verbena	207
Fruit 1–5-seeded; stamens 5	96. Honeysuckle	230
(2) Herbs.		
(*a*) Ovary superior, flowers regular.		
* Ovary separating into 2 distinct follicles.		
Style single, stamens distinct	81. Dogbane	192
Styles 2, stamens united.	82. Milkweed	194
** Ovary 1-celled.		
Fruit a legume	47. Pea or Pulse	126
Fruit a capsule.		
Leaves alternate.		
Stamens opposite the lobes of the corolla	77. Primrose	184
Stamens alternate with the lobes of the corolla	85. Waterleaf	201
Leaves opposite	80. Gentian	191
Leaves all reduced to mere scales, plants never green, root parasites	92. Broom Rape	223
**** Ovary 2-several-celled.		
Stamens 2 or 4	94. Plantain	225
Stamens 5, cells of the ovary 1–2-seeded.		
Fruit separating into 4 nutlets	86. Borage	203
Fruit a capsule	83. Morning-Glory	197
Stamens 5, cells of the ovary several-seeded.		
Stigma 1	89. Nightshade	214
Stigmas 3	84. Phlox	199
(*b*) Ovary superior, flowers zygomorphic.		
* Ovary 1-celled.		
Fruit a legume	47. Pea or Pulse	126

	Family	Page
** Ovary 2–4-celled.		
† Cells each 1-seeded.		
Ovary deeply 4-lobed	88. Mint	209
Ovary not deeply lobed.		
Stamens 2 or 4	87. Verbena	207
Stamens 8	53. Polygala	145
†† Cells each 2-several-seeded.		
Corolla lobes imbricate in the bud	90. Figwort	217
Corolla lobes convolute in the bud	93. Acanthus	224
(*c*) Ovary inferior.		
Flowers in an involucrate head	100. Composite	239
Flowers not in heads.		
Stamens 3.		
Leaves opposite	97. Valerian	235
Leaves alternate	98. Gourd	236
Stamens 4–5.		
Leaves alternate	99. Campanula	237
Leaves opposite or whorled	95. Madder	227

CLASS I. GYMNOSPERMS

Plants destitute of a closed ovary, style, or stigma. Ovules generally borne naked on a carpellary scale, which forms part of a cone. Cotyledons often several (Fig. 1).

1. PINACEÆ. Pine Family

Trees or shrubs with wood destitute of ducts, with resinous and aromatic juice. Leaves generally evergreen, and needle-shaped or awl-shaped. Flowers destitute of floral envelopes, monœcious or diœcious, the staminate ones consisting of catkin-like spikes of stamens and the pistillate ones consisting of ovule-bearing scales, arranged in spikes, which ripen into cones.

A

Each scale of the cone borne in the axil of a bract. Seeds 2, with wings.

Leaves evergreen, in bundles of 2–5. Pinus, I

Leaves evergreen, solitary, sessile, keeled on both surfaces. Picea, II

Leaves evergreen, solitary, petioled, flat. Tsuga, III

Leaves solitary, evergreen, flat above, keeled below. Abies, IV

Leaves clustered, deciduous, flat. Larix, V

B

Scales of the cone without bracts, cone becoming globular and woody. Leaves linear.

Leaves alternate, deciduous. Taxodium, VI

C

Scales of the cone few, without bracts. Leaves evergreen, generally scale-like or awl-shaped.

Cones dry and thin-scaled. — Thuja, VII

Cones berry-like. — Juniperus, VIII

*

I. PINUS L.

Sterile flowers somewhat resembling inconspicuous catkins, borne at the base of the young shoot of the season, each flower consisting of pollen-scales in spiral groups (Fig. 1, *2*). Fertile flower spikes consisting of spirally arranged carpel scales, each scale springing from the axil of a bract and bearing at its own base two ovules (Fig. 1, *3*). Fruit a cone, formed of the thickened carpellary scales, ripening the second autumn after the flower opens. Primary leaves, thin and chaffy bud scales, from the axils of which spring the bundles of 2–5 nearly persistent, needle-like, evergreen leaves, 1–15 in. long (Fig. 1).

1. P. Strobus L. White Pine. A tall tree, 75–160 ft. high, much branched and spreading when growing in open ground, but often with few or no living branches below the height of 100 ft. when growing in dense forests. Leaves clustered in fives, slender, 3–4 in. long, smooth and pale or with a whitish bloom. Cones 5–6 in. long, not stout. The wood is soft, durable, does not readily warp, and is therefore very valuable for lumber. In light soil, commonest N.

2. P. Tæda L. Loblolly Pine, Oldfield Pine. A large tree; bark very thick and deeply furrowed, becoming flaky with age; twigs scaly. Leaves in threes, 6–10 in. long, slender, very flexible; sheaths $\frac{2}{3}$–1 in. long. Cones solitary, oblong-conical, 3–5 in. long; scales thickened at the apex, the transverse ridge very prominent and armed with a short, stout, straight or recurved spine. Common, and often springing up in old fields; trunk containing a large proportion of sapwood; timber of little value for outside work.*[1]

3. P. rigida Mill. Northern Pitch Pine. A stout tree, 30–80 ft. high, with rough, scaly bark. Leaves in threes, 3–5 in. long, stiff and flattened. Cones ovoid-conical, 2–3 in. long, their scales tipped with a short, abruptly curved spine. Wood hard, coarse, and resinous, mainly used for fuel. Poor, sandy soil, especially eastward.

[1] Descriptions followed by an asterisk are taken (more or less simplified) from Professor Tracy's flora in the *Southern States Edition.*

4. P. virginiana Mill. Scrub Pine. A small tree, usually 20–30 ft. high, but sometimes much taller; bark of the trunk rough, nearly black; twigs smooth and with a bloom. Leaves in twos, 1–2 in.

Fig. 1. Scotch pine (*Pinus sylvestris*)

1, a twig showing: *a*, staminate catkins; *b*, pistillate catkins; *c*, a cone; *d*, needles. 2, an anther: *a*, side view; *b*, outer surface. 3, a carpel scale: *a*, inner surface; *b*, outer surface. 4, *a* a cone scale, *b* a seed wing, and *c* a seed. 5, section of a seed, showing the embryo. 1 is natural size; parts 2, 3, and 5 are magnified by the amount indicated by comparison with the vertical line alongside each. (After Wossidlo)

long, rigid, sheaths very short. Staminate catkins dull, yellowish-purple, 1 in. long. Cones solitary, short-peduncled, often reflexed, ellipsoid-conic, about 2 in. long; scales thickened at the apex and

armed with a slender, straight or recurved prickle. On dry, sandy soil; wood light, soft, weak, and of little value.*

5. P. sylvestris L. Scotch Pine (wrongly called Scotch Fir). A medium-sized tree, with the older bark reddish and scaly. Leaves in twos, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long. Cones rather small and tapering (Fig 1, *1, c*). Cultivated from Europe.

6. P. resinosa Ait. Red Pine, Norway Pine. A tall, rather slender tree, with bark reddish-brown and moderately smooth. Leaves in twos, slender, and 5–6 in. long. Cones borne at the ends of the branches, smooth, about 2 in. long. A valuable timber tree, which often grows in small, scattered clumps; wood firm, pale red, and not very resinous; used in house and bridge building, and for masts and spars.

7. P. palustris Mill. Long-Leaved Pine. A large tree; bark thin-scaled, wood very resinous, old trees with only a few spreading branches near the top. Leaves in threes, 10–15 in. long. Sheaths 1–$1\frac{1}{4}$ in. long, crowded near the ends of very scaly twigs. Staminate catkins 2–3 in. long, bright purple, conspicuous. Cones terminal, ellipsoid-conical, 6–10 in. long, diameter 2–3 in. before opening, 4–6 in. when fully opened; scales much thickened at the apex and armed with a short recurved spine at the end. The most common tree in the pine barrens; wood hard, strong, and durable, especially valuable for floors and inside work.*

II. PICEA Link

Sterile flowers generally axillary (sometimes terminal), borne on the twigs of the preceding year. Fertile flowers terminal. Fruit a nodding, thin-scaled cone, ripening in the first autumn. Leaves evergreen, needle-shaped, four-angled, scattered or spirally arranged.

1. P. mariana BSP. Black Spruce. A small tree, usually only 20 or 30 ft. high, often less. Leaves strongly 4-angled, bluish-green, and glaucous, $\frac{1}{4}$–$\frac{3}{4}$ in. long. Cones ovoid, pointed, $\frac{1}{2}$–$1\frac{1}{2}$ in., usually about 1 in. long, persisting sometimes for 20–30 years. Wood of little value except for paper pulp. The tree is especially abundant northward and is of common occurrence in peat bogs.

2. P. rubra Dietrich. Red Spruce. A large tree, 70–80 or even 100 or more feet high, of strict conical habit. Leaves dark green or yellowish and glossy, $\frac{1}{2}$–$\frac{5}{8}$ in. long. Cones ovoid-oblong, acute, usually $1\frac{1}{2}$–2 in. long, mostly falling the first year. This is the principal timber spruce of the northeastern United States, and furnishes much rather tough lumber for use in floor joists, scantling, and similar purposes.

3. P. canadensis BSP. White Spruce, Skunk Spruce, Cat Spruce. A tall, rather conical tree, 60–70 ft. high. Leaves pale and with a bloom sometimes ¾ in. long. Cones cylindrical, with rounded ends, about 2 in. long, falling inside of one year. A handsome tree, valuable for timber, ranging far northward.

4. P. Abies Karst. Norway Spruce. A large tree. Leaves dark green, ¾–1 in. long. Cones 5–7 in. long. Cultivated from Europe.

III. TSUGA Carrière

Sterile flowers, clusters of stamens springing from the axils of leaves of the preceding year. Cones terminal, on twigs of the preceding year, drooping, thin-scaled, ripening the first year. Leaves minutely petioled, short, flat, white beneath, 2-ranked.

1. T. canadensis Carrière. Hemlock. A large tree, in age branchless below when growing in dense woods. When young the spray is very graceful and abundant. Leaves short-linear. Cones ¾ in. or less in length. The wood is coarse and splintery, but useful for fences and other rough work. The thick reddish bark is of great value for tanning.

IV. ABIES Hill

Sterile flowers from axils of leaves of the preceding year. Cones erect, on the sides of the branches, with deciduous scales, ripening the first year. Leaves scattered, but on horizontal branches appearing 2-ranked, flat above, silvery, and with a prominent midrib below.

1. A. balsamea Mill. Balsam Fir. A slender tree, 50–60 ft., occasionally 80 ft., high, with dense foliage. Leaves narrowly linear, less than 1 in. long. Cones violet-colored until old, cylindrical, 2–4 in. long. The bark contains many large blisters, filled with the well-know Canada balsam. The wood is brittle and of little value.

V. LARIX Mill.

Flower spikes short, opening in early spring, before the leaves; the fertile ones, while still young, of a beautiful crimson color. Fruit a small cone, with thin scales. Leaves none of them scaly, but all needle-shaped, soft, deciduous, very numerous, in little brush-like bundles.

1. L. laricina Koch. American Larch, Tamarack, Hackmatack (wrongly, but quite generally, called Cypress and Juniper). A tall, slender tree, 30–100 ft. high. Leaves slender and less than 1 in. long, very pale bluish-green. Cones $\frac{1}{2}$–$\frac{3}{4}$ in. long, few-scaled. Wood hard, tough, and heavy, of considerable use for shipbuilding.

2. L. decidua Mill. European Larch. Leaves bright green and longer. Cones longer than in the preceding species and many-scaled. Cultivated from Europe.

VI. TAXODIUM Richard

Trees. Leaves spreading so as to appear 2-ranked, deciduous. Flowers monœcious, appearing before the leaves; staminate ones numerous, globose, forming long, terminal, drooping, panicled spikes; anthers 2–5-celled. Pistillate flowers single or in pairs, bractless, the peltate scales 2-ovuled. Cone globose; the very thick woody scales angular, separating at maturity. Seeds 3-angled, pyramidal.*

1. T. distichum Richard. Bald Cypress. A very large tree; bark dark brown, rough, fibrous; many of the twigs deciduous with the leaves. Leaves alternate, opposite, or whorled, 2-ranked, flat, linear, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Cones terminal, globose, about 1 in. in diameter; ends of the scales much thickened, wrinkled, and with a distinct triangular marking. Common in swamps and on the borders of streams; wood reddish, soft, light; specially valued for shingles and fence posts, and for boat building.*

VII. THUJA L.

Flowers small, terminal, monœcious, on different branches. Stamens each consisting of a scale-like portion bearing 4 anther-like cells. Pistillate flowers consisting of a few overlapping scales which ripen into a small, loose cone. Leaves evergreen, opposite, and closely overlapping on the stem, of two kinds, those on the more rapidly growing twigs awl-shaped, the others mere scales.

1. T. occidentalis L. Arbor Vitæ, Cedar. A small tree, 20–50 ft. high, with soft, fibrous bark. Leaves mostly awl-shaped and blunt. Cones ellipsoidal, their scales 2-seeded. Grows on rocky ledges, but reaches its greatest size in cool cedar swamps. Wood soft, yellowish, fragrant, durable, prized for shingles and fence posts.

VIII. JUNIPERUS L.

Flowers very small, lateral, diœcious, or sometimes monœcious. Scales of the staminate flower shield-shaped, with 3–6 anther cells. Fertile flowers with 3–6 fleshy scales which unite into a berry-like, 1–3-seeded fruit. Leaves awl-shaped or scale-shaped.

1. J. communis L. JUNIPER. A low, spreading shrub (one variety prostrate in circular masses). Leaves linear-awl-shaped, with needle-like points, each marked with a distinct stripe of bloom along the center of the upper surface, borne in whorls of three. Fruit a dark blue aromatic berry, $\frac{1}{4}$ in. or more in diameter. Grows in dry pastures and on sterile hillsides N.

2. J. virginiana L. RED CEDAR, SAVIN. Ranges in size and shape from a low, rather erect shrub, to a conical tree 90 ft. high. Leaves of two kinds, those on the rapidly growing shoots awl-shaped and pointed, those on the shortest twigs scale-shaped, obtuse, or nearly so, and closely appressed to the stem. Fruit small, bluish, with a white bloom. Found all the way from British America to Florida. Wood soft, fragrant, reddish, exceedingly durable in the ground, valued for the manufacture of moth-proof chests and especially for lead pencils.

CLASS II. ANGIOSPERMS

Plants with a closed ovary, in which the seeds are matured. Cotyledons 1 or 2.

SUBCLASS I. MONOCOTYLEDONOUS PLANTS

Stems with the fibrovascular bundles scattered among the parenchyma cells; in perennial plants no annual rings of wood. Leaves usually parallel-veined, alternate, nearly always entire. Parts of the flower generally in threes (never in fives). Cotyledon 1.

2. TYPHACEÆ. Cat-Tail Family

Perennial marsh or aquatic plants. Rootstock stout, creeping; stem simple, cylindrical, erect. Leaves simple, strap-shaped, sheathing at the base, nerved and striate. Flowers monœcious, in a single terminal spike, staminate part of the spike uppermost, each part subtended by spathe-like deciduous bracts. Perianth of fine bristles. Staminate flowers sessile, stamens 2–7; filaments connate, subtended by minute bracts. Pistillate flowers short-pediceled. Ovary 1–2-celled; styles 1–2. Fruit small, nut-like.*

TYPHA L.

Characters of the family.

1. **T. latifolia** L. Cat-Tail. Stem erect, jointed below, 5–8 ft. high. Leaves nearly as long as the stem, about 1 in. wide, netted and with a bloom. Spike cylindrical, dark brown or black; staminate portion above the pistillate, usually without any interval between them, each 4–8 in. long and about 1 in. in diameter. Fruit furrowed. **Common in marshes and shallow ponds.***

3. ALISMACEÆ. Water Plantain Family

Annual or perennial marsh herbs, usually with creeping runners or rootstocks. Stems scape-like. Leaves long-petioled, sheathing at the base; petiole rounded; blade nerved, netted, or sometimes wanting. Flowers in racemes or panicles, bisexual, monœcious or dicœcious; pedicels in bracted whorls. Sepals 3, persistent; petals 3 or wanting. Stamens 6 or more. Ovaries few or many, 1-celled, 1-seeded; style short or none. Fruit a 1-seeded akene.*

I. SAGITTARIA L

Perennial; rootstocks mostly knobby or tuber-bearing. Scapes erect or decumbent. Leaves long-petioled, sheathing at the base, the blade round and netted, or wanting. Flowers monœcious or dicœcious, racemed in 3-bracted whorls of threes, the upper flowers usually staminate. Sepals 3, persistent; petals 3, withering-persistent or deciduous. Stamens few or many. Ovaries in globose heads, 1-ovuled; style short, persistent. Fruit a subglobose head of flattened akenes.*

1. **S. latifolia** Willd. Broad-Leaved Arrowhead. Leaves very variable in size and shape, from broadly sagittate to linear, those growing on the drier soil being usually the broader; petioles 6–30 in. long. Scape smooth or slightly downy, 6–36 in. high; bracts acute. Flowers monœcious or sometimes dicœcious, white, 1 in. or more in width; pedicels of the staminate flowers twice the length of those of the fertile flowers. Filaments long, smooth, and slender. Akenes with beak nearly horizontal. Ditches and muddy places.*

2. **S. graminea** Michx. Grass-Leaved Sagittaria. Leaves long-petioled, lanceolate, or elliptical, and acute at each end, 3–5-nerved, or often linear, the earlier often reduced to flattened petioles. Scape slender, usually longer than the leaves, simple, weak, often prostrate in fruit; bracts small, ovate, connate at the base. Flowers monœcious or dicœcious, on long, thread-like pedicels, about ½ in. wide. Stamens 10–20, filaments downy. Akenes nearly beakless. In ditches and shallow pools.*

II. ALISMA L.

Annual or perennial herbs. Leaves erect or floating, blades prominently ribbed and netted, or even pinnately veined.

Scapes erect, becoming longer than the leaves, cylindrical, spongy. Flowers bisexual, in paniculate, 3-bracted umbels, small, white or pink. Stamens 6–9. Ovaries numerous in one or more whorls on a flat receptacle. Fruit 1-seeded akenes which are ribbed on the back and sides.*

FIG. 2. Diagrammatic representation of a several-flowered grass spikelet

g, *g'*, the glumes; *p*, *p'*, the palets; *l*, lodicules; *f*, a flower. The axis is much lengthened, to separate the flowers. (After Schimper)

FIG. 3. Spike-like panicle of vernal grass (*Anthoxanthum*)

a, mature anthers. (Slightly enlarged)

1. A. Plantago-aquatica L. WATER PLANTAIN. Perennial; root fibrous. Leaves ovate or somewhat cordate, 5–7-nerved when erect, floating leaves narrower and sometimes linear. Scapes usually single; panicle 1–2 ft. long; flowering branches whorled, subtended by three narrow, striate bracts; pedicels slender, elongated. Ovaries 15–20 in a single whorl; base of the short style persistent, forming a beak at the inner angle of the akene. Akenes obliquely obovate, 2–3-keeled on the back. Common in ponds and muddy places.*

4. GRAMINEÆ. GRASS FAMILY

Mostly herbs, with usually hollow stems, closed and enlarged at the nodes. Leaves alternate, in two ranks, with sheathing bases, which are split open on the side opposite the blade. Flowers nearly or quite destitute of floral envelopes, solitary, and borne in the axils of scaly bracts, which are arranged in two ranks

overlapping each other on 1–many-flowered *spikelets;* these are variously grouped in spikes, panicles, and so on. Fruit

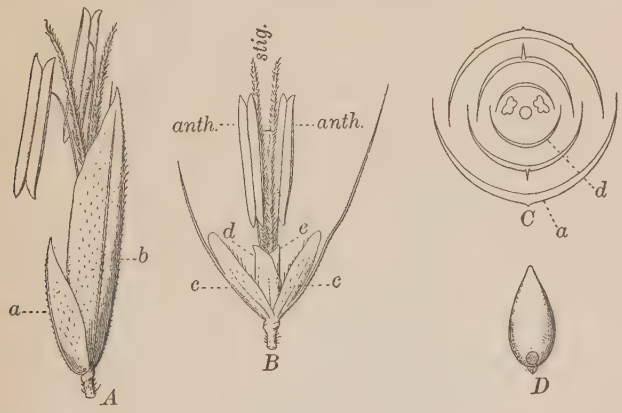


Fig. 4. Vernal grass (*Anthoxanthum*)

A, a one-flowered spikelet: *a*, *b*, the outer empty glumes. *B*, a spikelet with the outer glumes removed: *c*, *c*, the inner empty glumes (neuter flowers) with long, bristle-shaped appendages; *d*, *e*, palets; *anth.*, anthers; *stig.*, stigmas. *C*, diagram of cross section of a spikelet: *a*, glume; *d*, palet. *D*, a fruit. (All magnified.) (After Cosson and De Saint-Pierre)

a grain. (The family is too difficult for the beginner, but the structure and grouping of the flowers may be gathered from a careful study of Figs. 2, 3, 4.)

5. CYPERACEÆ. Sedge Family

Grass-like or rush-like herbs, with solid, usually triangular, stems, growing in tufts. The sheathing base of the generally 3-ranked leaves, when present, is not slit as in grasses. The flowers are usually somewhat less inclosed by bracts than those of grasses; the perianth is absent or rudimentary; stamens generally 3; style 2-cleft or 3-cleft.

The flower cluster and the flower of a sedge may be understood from an inspection of Fig. 5.

The species are even more difficult to determine than those of grasses.

FIG. 5. Inflorescence, flower, and seed, of a sedge
(Great Bulrush, *Scirpus lacustris*)

A, magnified flower, surrounded by a perianth of hypogynous bristles; *B*, the seed; *C*, section of the seed, showing the small embryo inclosed in the base of the endosperm. (After Lindley)

6. ARACEÆ. Arum Family

Perennial herbs, with pungent or acrid juice. Leaves often netted-veined. Small, unisexual or bisexual flowers, clustered

along a peculiar fleshy spike called a *spadix*, and frequently more or less covered by a large, hood-like bract called a *spathe*. Perianth, when present, of 4–6 parts; often wanting. Fruit usually a berry.

I. ARISÆMA Martius

Perennial herbs, springing from a corm or a tuberous rootstock. Spathe rolled up at base. Summit of spadix naked, the lower part flower-bearing; staminate flowers above, pistillate ones below. Stigma flat. Ovary 1-celled. Berry 1–few-seeded.

1. A. triphyllum Schott. Indian Turnip, Jack-in-the-Pulpit. Leaves generally 2, each of 3 elliptical-ovate, pointed leaflets. Spadix club-shaped, bearing usually only one kind of fully developed flowers; that is, full-sized pistillate and rudimentary staminate ones, or the reverse. Spathe much longer than the spadix, and covering it like a hood. Corm turnip-like, but much wrinkled, very starchy, and filled with intensely burning juice.

2. A. Dracontium Schott. Green Dragon, Dragon Root. Leaf usually single, divided into 7–11 rather narrow, pointed leaflets; spadix tapering to a long, slender point, often bearing fully developed staminate and pistillate flowers.

II. SYMPLOCARPUS Salisb. (SPATHYEMA)

Rootstock very stout, with many long, cylindrical roots. Leaves clustered, very large, and entire. Spathe shell-shaped, very thick. Spadix globular, thickly covered with bisexual flowers. Sepals 4. Stamens 4. Style 4-angled. Fruit globular or ellipsoidal, with the seeds slightly buried in the enlarged spadix.

Coarse, stemless herbs, with a powerful scent like that of the skunk and of onions.

1. S. fœtidus Nutt. Skunk Cabbage. Leaves many, slightly petioled, 1–2 ft. long, appearing after the flowers. The latter are usually seen before the ground is wholly free from frost, often earlier than any other flower. Bogs and wet meadows, very common N.

III. ACORUS L.

Rootstocks horizontal, long, and moderately stout, aromatic. Leaves long, upright, sword-shaped. Spathe much like the

leaves. Spadix projecting from the edge of the spathe, consisting of numerous bisexual flowers. Sepals 6. Stamens 6. Ovary 2–3-celled, with numerous ovules. Fruit 1–few-seeded.

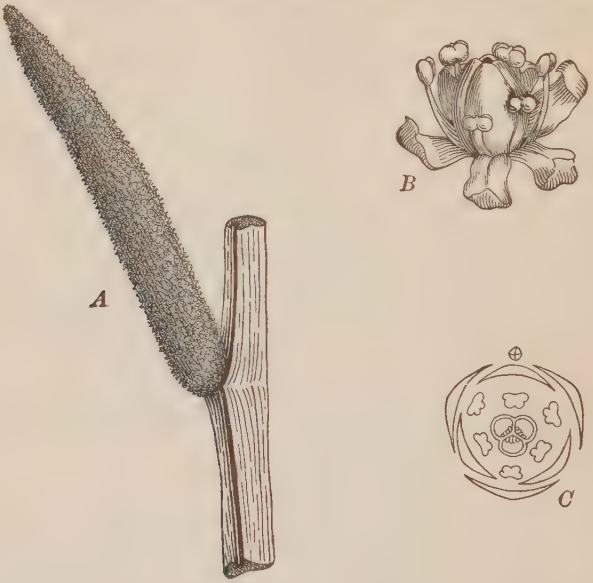


FIG. 6. *Acorus Calamus*

A, spadix; *B*, a single flower, enlarged; *C*, diagram of flower, enlarged. (After Schimper)

1. A. Calamus L. SWEET FLAG. Scape with a long, leaf-like prolongation (spathe) beyond the green, very closely flowered spadix. Along borders of brooks and swamps.

The rootstocks furnish the well-known calamus or "sweet flag root" sold everywhere by druggists.

7. COMMELINACEÆ. SPIDERWORT FAMILY

Herbs, with slimy or mucilaginous juice; stems somewhat succulent, jointed, leafy, simple or branched. Leaves simple, succulent, narrow, entire, sheathing at the base, sheaths entire

or split. Flowers in terminal cymes or umbels, bisexual, often zygomorphic. Sepals 3, persistent, foliaceous or colored. Petals 3, soon falling or liquefying. Stamens 6 or fewer, often some of them abortive. Ovary 2–3-celled; style single; stigma entire or 3-lobed. Fruit a 2–3-celled, 2–3-valved capsule; seeds solitary or several in each cell.*

I. TRADESCANTIA L.

Perennial, stem simple or branched. Leaves very narrow. Flowers in terminal and axillary bracted umbels, actinomorphic, 1 in. broad. Sepals 3, herbaceous. Petals 3, soon falling, or liquefying to jelly. Stamens 6, sometimes 3 shorter than the others; filaments bearded or smooth. Ovary 3-celled, with 2 ovules in each cell; pedicels recurved in fruit. Capsule 3-celled, 3-valved, 3–6-seeded.*

1. T. virginiana L. SPIDERWORT. Stem erect, stout, smooth, or with long, soft hairs, 1–2 ft. high. Leaves linear, keeled, often purple-veined, long, taper-pointed, 1 ft. or more in length. Bracts similar to the leaves. Umbels sessile, 2–many-flowered, flowers in 2 rows in the bud. Petals blue or purple, twice as long as the sepals. Stamens blue, filaments densely bearded. Capsule ovoid or oblong. On dry, sandy soil.*

2. T. pilosa Lehm. HAIRY SPIDERWORT. Stem stout, erect or zigzag, branched, with long, soft hairs, or nearly smooth, 1–2 ft. high. Leaves linear-oblong, taper-pointed at the apex, narrowed at the base, hairy on both sides. Umbels axillary and terminal, many-flowered. Pedicels and sepals with soft, glandular hairs. Flowers blue or purple, $\frac{3}{4}$–1 in. wide. Seeds pitted. In rich soil.*

II. COMMELINA L.

Annual or perennial, stem branching, erect or procumbent, smooth or downy. Leaves petioled or sessile, entire, the floral ones heart-shaped, folded, and forming a spathe inclosing the base of the cymes. Flowers not actinomorphic. Sepals mostly colored, 1 of them smaller. Petals blue, unequal, 2 of them kidney-shaped and long-clawed, the third one smaller. Stamens 6, only 3 of them fertile; filaments smooth. Capsule 1–3-celled; seeds 1–2 in each cell.*

1. C. virginica L. Virginia Dayflower. Stem erect, downy, 1–2 ft. high. Leaves lanceolate to oblong-lanceolate, taper-pointed, 3–5 in. long, somewhat rough above; sheaths inflated, hairy, the opening often fringed. Spathes containing a slimy secretion. Flowers 1 in. wide, the odd petal lanceolate. Capsule 3-seeded, the dorsal cell not splitting open. On moist, sandy soil.*

III. ZEBRINA Schnizl.

Trailing or slightly climbing herbs. Leaves often striped. Flowers usually in pairs. Calyx with a short tube, regularly or irregularly 3-parted. Corolla nearly actinomorphic, with tube longer than the calyx. Filaments naked or bearded. Ovary 3-celled, 3–6-ovuled.

1. Z. pendula Schnizl. Wandering Jew. Stems perennial, prostrate or nearly so, branching freely, rooting easily at the nodes. Leaves somewhat succulent, lance-ovate or oblong, crimson beneath, green or dark purplish above, often with two wide silvery stripes. Cultivated from Mexico.

8. PONTEDERIAÇEÆ. Pickerel-Weed Family

Perennial marsh or aquatic herbs, stems simple or branched, succulent. Leaves simple, alternate. Flowers solitary or spiked, each subtended by a leaf-like spathe, perfect, mostly not actinomorphic. Perianth corolla-like, 6-parted. Stamens 3 or 6, unequal, inserted irregularly in the tube or throat of the perianth. Ovary superior, 1- or 3-celled; style single; stigma entire or toothed. Fruit a 1-seeded utricle.*

PONTEDERIA L.

Stem erect, from a thick, creeping rootstock, bearing a single leaf above the middle and several sheathing, bract-like leaves at its base. Radical leaves numerous, thick, parallel-veined. Petiole long, from a sheathing base. Flowers in terminal spikes. Perianth 2-lipped, lobes of the upper lip ovate, of the lower oblong, spreading. Stamens 6, the 3 upper short and often imperfect, the 3 lower protruding. Ovary 3-celled,

FIG. 7. Rushes

A, plant of *Juncus tenuis*, one half natural size; *B*, flower of same, magnified; *C*, fruit magnified; *D*, flower of wood rush (*Luzula*), magnified. (*D*, after Warming)

but only 1 cell ovule-bearing; the 1-seeded utricle inclosed by the base of the perianth.*

1. **P. cordata** L. Pickerel Weed. Stem stout, erect, 2–4 ft. high. Leaves long, from heart-shaped to lanceolate and often halberd-shaped: apex and basal lobes obtuse, finely nerved. Spike dense, 2–4 in. long; peduncles inclosed by the spathe. Perianth hairy, blue, the upper lip with 2 yellow spots; tube 6-ribbed, curved, rather longer than the lobes. Ovary oblong. In ponds and slow streams.*

9. JUNCACEÆ. Rush Family

Grass-like perennial or annual herbs, mostly growing on wet soil. Stems mostly erect but sometimes creeping, simple or branched, naked or leafy and jointed. Leaves cylindrical, sheathing at the base, very slender and pointed or flattened and grass-like. Flowers in cymes or panicles, which may be very loose and spreading, or so compact as to form a head, sometimes with a rigid scape prolonged beyond the flower cluster. Flowers usually bracted. Perianth of 6 nearly equal, scale-like, persistent divisions. Stamens 3 or 6, inserted on the base of the perianth. Ovary free, 1- or 3-celled, many-ovuled; style single; stigmas 3, usually hairy. Fruit a 1- or 3-celled, 3–many-seeded capsule. [Most species flower late in the season, and their identification is too difficult for one without considerable experience.]*

10. LILIACEÆ. Lily Family

Mostly herbs. Flowers actinomorphic. Perianth free from the ovary. Stamens nearly always 6, one before each division of the perianth. Ovary usually 3-celled; fruit a pod or berry, few–many-seeded.

Except in the genus Trillium the divisions of the perianth are colored nearly alike.

SUBFAMILY I. LILIACEÆ PROPER

Not tendril climbers, rarely dicœcious.

A

Styles or sessile stigmas 3, more or less separate.

Leaves flat, lanceolate, or spatulate. Flowers dicœcious, showy. Chamælirium, I

Leaves grass-like. Flowers bisexual, showy. Amianthium, II

Leaves 3-ranked, strongly nerved and plaited. Flowers somewhat monœcious, small. Veratrum, III

B

Style undivided (in No. XXIII, 3 sessile stigmas). Plants from rootstocks.

Leaves perfoliate. Flowers solitary, drooping, yellow. Uvularia, IV

Leaves broad, clasping. Flowers solitary or nearly so, drooping, yellow. Oakesia, V

Leaves scale-like. Thread-like branches borne in their axils. Flowers small, bell-shaped. Asparagus, XVIII

Leaves several–many, sessile or clasping, alternate. Flowers small, 6-parted, white, in a terminal simple or compound raceme. Smilacina, XIX

Leaves only 2–3, sessile or slightly petioled. Flowers very small, 4-parted, solitary or in a small terminal cluster. Maianthemum, XX

Leaves clasping. Flowers solitary or in pairs, greenish-white or rose-purple, borne on pedicels abruptly bent near the middle. Streptopus, XXI

Leaves nearly sessile or partly clasping. Flowers axillary, greenish, on pedicels jointed near the flower. Polygonatum, XXII

Leaves only 2, directly from the rootstock. Flowers in a raceme, bell-shaped, white, sweet-scented. Convallaria, XXIII

Leaves 3, netted-veined. Flower single, large, terminal. Trillium, XXIV

C

Style undivided. Plants from fibrous roots.

Flowers yellow or orange. Hemerocallis, VIII
Flowers white. Yucca, XVII

D

Style usually undivided. Plants from coated or solid-looking bulbs.

Leafy-stemmed plants. Flowers large, solitary, or apparently umbeled. Fritillaria, X

Apparently stemless plants.

(*a*) Plants with the smell of onions or garlic. Flowers umbeled. Allium, VI
(*b*) Plants scentless. Flowers umbeled. Nothoscordum, VII
(*c*) Flower solitary, erect, large. Tulipa, XII
(*d*) Flower solitary, nodding. Erythronium, XI
(*e*) Flowers racemed. Perianth with hardly any tube. Stigma a single knob. Scilla, XIII
(*f*) Flowers racemed. Perianth with hardly any tube. Stigma 3-cleft. Camassia, XIV
(*g*) Flowers corymbed. Perianth with hardly any tube. Leaves linear. Ornithogalum, XV
(*h*) Flowers racemed. Perianth with a tube. Leaves lance-linear. Hyacinthus, XVI

E

Style undivided. Plants from scaly bulbs. Lilium, IX

SUBFAMILY II. SMILACEÆ

Climbers, often tendril-bearing. Flowers diœcious. Smilax, XXV

I. CHAMÆLIRIUM Willd.

Rootstock short and thick, bitter. Stem simple, erect, leafy, smooth. Lower leaves spatulate to obovate, the stem leaves narrower. Flowers small, white, in a spike-like raceme, diœcious. Perianth of 6 linear-spatulate segments. Stamens 6, filaments longer than the perianth. Ovary 3-celled; styles 3. Fruit an ovoid, 3-angled, many-seeded capsule.*

1. C. luteum Gray. UNICORN ROOT, DEVIL'S BIT. Stem furrowed, staminate plants 1–2 ft. high, pistillate taller, often 3 ft. or more. Lower leaves obovate, clustered, the upper small and bract-like. Staminate racemes slender and drooping, the pistillate erect. Flowers short-pediceled. Capsule 3-valved, seeds linear-oblong, winged at the ends. On low ground.*

II. AMIANTHIUM Gray. (CHROSPERMA)

Stem simple, glabrous, erect from a bulbous base. Leaves long and slender. Flowers white, in a simple terminal raceme, bisexual. Perianth of 6 segments which are sessile and glandless. Stamens 6, somewhat perigynous. Ovary 3-lobed, 3-celled; fruit a dehiscent, 3-lobed capsule, the lobes becoming awl-shaped by the persistent style bases; cells few-seeded.*

1. A. muscætoxicum Gray. FLY POISON. Bulb ovoid or oblong. Stem somewhat angled below, 1–3 ft. high. Lower leaves strap-shaped, channeled, the upper small and bract-like. Raceme dense, cylindrical, pedicels from the axils of minute ovate bracts. Perianth segments ovate, white, becoming greenish, nearly as long as the slender stamens. Styles spreading. Capsule with divergent lobes; seeds ovoid, red. In rich woods.*

III. VERATRUM L.

Simple-stemmed perennials. Roots fibrous, from the thickened base of the stem, poisonous, emetic. Leaves 3-ranked, plaited, and veiny. Flowers panicled, greenish or brownish. Sepals 6, spreading, nearly hypogynous. Stamens shorter than the perianth, and somewhat perigynous. Ovary of 3 carpels united at base. Fruit a few-seeded capsule, splitting into 3 parts.

1. V. viride Ait. WHITE HELLEBORE, INDIAN POKE. Stem stout, 2–7 ft. high, very leafy. Flowers very numerous, in a panicle, composed of spike-like racemes. Sepals yellowish-green. Wet meadows and brooksides.

2. V. Woodii Robbins. Stem slender, 2–5 ft. high, not very leafy. Flowers in a long, narrow panicle. Sepals greenish-purple or almost black. Woods and dry hillsides.

IV. UVULARIA L.

Rather low plants with short rootstocks. Leaves alternate, broad, and parallel-veined. Flowers yellow or yellowish,

drooping, borne singly at the end of the forking stem. Perianth of 6 similar and separate narrow spatulate sepals, each grooved and nectar-bearing inside toward the base. Stamens 6, with linear anthers, which are much longer than the filaments. Style 3-cleft. Pod 3-lobed, 3-celled, few-seeded.

1. U. perfoliata L. MEALY BELLWORT. Leaves much as in the preceding species. Flowers very pale yellow, with shining grains on the inner surfaces of the twisted sepals; anthers sharp-pointed. Plant about two-thirds the size of the preceding.

2. U. grandiflora Sm. LARGER BELLWORT. Leaves oblong, with the base clasping the stem so as to make it appear to run through the leaf a little way from the base. Flowers greenish-yellow, 1½ in. long; anthers obtuse. A leafy plant, 1–2 ft. high.

V. OAKESIA Wats.

Plants with much the aspect of the preceding genus, but with merely sessile leaves, triangular winged pods, and slender, creeping rootstocks.

1. O. sessilifolia Wats. WILD OATS, STRAW LILIES. Stem slender, zigzag. Leaves lance-oval, thin, smooth, pale beneath, 1–1½ in. long. Flower cream color, nearly 1 in. long.

VI. ALLIUM L.

Herbs appearing stemless from coated bulbs with the characteristic odor of onions. Bulbs solitary or clustered. Leaves narrowly linear or slender-tubular, with a bloom. Flowers small, on slender pedicels, in terminal umbels on naked scapes, the umbels often bracted or inclosed in a spathe. Perianth 6-parted, persistent; stamens 6, somewhat perigynous, filaments filiform or dilated below. Ovary sessile, 3-celled; style thread-like, jointed; stigma entire. Fruit a 3-celled, 3-valved, few-seeded capsule. Flowers sometimes changed into bulblets.*

1. A. reticulatum Don. Resembling *A. Nuttallii*, but with larger bulbs. Leaves narrowly linear. Scape slender; bracts usually 2, taper-pointed; pedicels slender, ¼–½ in. long. Flowers white or pink; segments of the perianth thin. Capsule crested. W.

2. A. Nuttallii Wats. Bulbs ovoid, their coats with a fibrous network. Leaves basal, narrowly linear. Scape 4–8 in. high; bracts

3 or 2; pedicels $\frac{1}{3}$–$\frac{1}{2}$ in. long. Flowers rose color or white, the segments of the perianth becoming rigid in the fruit. On prairies W. and S.W.

3. A. canadense L. MEADOW GARLIC. Bulbs ovoid, the outer coats of white and thin, dry, netted fibers. Leaves narrowly linear, flat, or concave above. Scape cylindrical, 1 ft. high. Bracts of the umbel 2–3, ovate, acuminate; umbel consisting mostly of sessile bulblets. The few flowers long-pediceled, rose-colored. Perianth about as long as the stamens. Filaments dilated below. Capsule shorter than the perianth, 6-toothed, ovules 2 in each cell. On moist soil.*

4. A. mutabile Michx. WILD ONION. Bulbs ovoid, their coats with a very prominent fibrous network. Leaves basal, channeled, narrowly linear. Scape 1–2 ft. high, bracts taper-pointed, pedicels almost 1 in. long. Umbel rarely bearing bulblets. Flowers pink, rose color, or white; segments of the perianth thin. In moist soil S. and W.

5. A. vineale L. FIELD GARLIC. Bulb mostly solitary. Leaves cylindrical, hollow, very slender. Scape slender, sheathed below the middle by the bases of the leaves. Umbels often crowded with bulblets. A troublesome weed in moist meadows and fields eastward, giving milk a strong flavor of onions or garlic. Naturalized from Europe.

VII. NOTHOSCORDUM Kunth

Scape-bearing herbs resembling *Allium*, but with no odor of onions. Flowers yellow or yellowish-green, in a loose, erect umbel, with 2 bracts.

1. N. bivalve Britton. Bulb small, often with little bulbs at its base. Leaves narrowly linear. Scape not exceeding 1 ft. high, the umbel 2-bracted, pedicels thread-like, at length 1–2 in. long. Flowers $\frac{1}{2}$ in. long or less, the perianth segments narrowly oblong, thin. On prairies and in open woods.

VIII. HEMEROCALLIS L.

Perennial, from a fascicle of fleshy roots. Stem erect, branched, smooth. Leaves mostly basal and linear. Flowers on branching scapes, large, yellow or orange, solitary or corymbed. Perianth funnelform, with a spreading limb much longer than the tube. Stamens 6, inserted in the top of the tube, shorter than the lobes, curved upward. Ovary 3-celled, many-ovuled; style longer than the stamens, curved upward; stigma knobbed. Fruit a 3-celled, 3-angled capsule.*

1. H. fulva L. DAY LILY. Scapes stout, branched above, with a few bract-like leaves, smooth, 3–5 ft. high. Leaves very long, strap-shaped, acute, channeled. Flowers short-pediceled, tawny-yellow; perianth lobes oblong, netted-veined, lasting only one day. Introduced from Asia and common in old gardens.*

IX. LILIUM L.

Perennial, from scaly bulbs; stem erect, leafy, usually tall and slender. Leaves sessile, scattered or whorled. Flowers large, erect or drooping. Perianth corolla-like, deciduous; segments 6, spreading or recurved above, sessile or clawed, each with a nectar-bearing groove near the base. Stamens 6, elongated; anthers linear, versatile. Ovary 3-celled, many-ovuled; style long and slender; stigma 3-lobed. Fruit a 3-celled, dehiscent, many-seeded capsule.

1. L. longiflorum Thunb. LONG-FLOWERED WHITE LILY. Stem 1–3 ft. high. Leaves thick, lanceolate, scattered. Flower single, pure white, funnel-shaped, 5–6 in. long. Var. **eximium**, the Easter lily, bears several very showy and sweet-scented flowers. Cultivated from China and Japan.

2. L. philadelphicum L. WILD RED LILY. Stem 2–3 ft. high. Leaves linear-lanceolate, the upper ones generally whorled. Flower usually solitary (sometimes 2 or 3), erect, reddish-orange, with tawny or purplish spots inside. Sepals with claws. Dry or sandy ground, borders of thickets, etc.

Var. **andinum** Ker. WESTERN RED LILY. Stem rather slender. Leaves linear, all alternate or the upper ones whorled. Flowers 1–3, erect. Segments of the perianth red, orange, or yellow, spotted beneath, the claw shorter than the blade. In dry soil W.

3. L. canadense L. WILD YELLOW LILY, MEADOW LILY. Stem 2–5 ft. high. Leaves lanceolate, 3-nerved, the margins and nerves roughish with short hairs, whorled. Flowers usually 3, sometimes more numerous, all nodding, on peduncles 3–6 in. long, yellow or orange, with dark purple or brown spots inside. Sepals without claws, recurved. Moist meadows and borders of woods.

X. FRITILLARIA L.

Leafy-stemmed perennials, from scaly or coated bulbs. Flowers single or several, nodding. Perianth bell-shaped, a nectar-bearing spot above the base of each division. Stamens as long as the petals.

1. F. Meleagris L. Guinea-Hen Flower. Stem 1 ft. high. Leaves linear, alternate, channeled. Flower usually single, large, purplish, checkered with blue and purple or yellow. Cultivated from Europe.

2. F. imperialis L. Crown Imperial. Stem 3–4 ft. high. Leaves abundant in whorls about the middle or lower part of the stem, lanceolate or lance-oblong. Flowers several, large, yellow or red, in an umbel-like cluster beneath the terminal crown of leaves. Cultivated from Europe.

XI. ERYTHRONIUM L.

Nearly stemless herbs, arising from rather deeply buried bulbs. Leaves 2, long and smooth, with underground petioles. Scape arising from between the bases of the leaves. Flower commonly single, nodding.

1. E. americanum Ker. Yellow Adder's-Tongue. Leaves mottled. Flowers handsome. Perianth light yellow. Style club-shaped; stigmas united.

2. E. albidum Nutt. White Dogtooth Violet. Leaves not much mottled. Perianth bluish-white. Stigmas 3, short and spreading.

XII. TULIPA L.

Herbs appearing stemless, from coated bulbs. Leaves sessile. Scape simple. Flower solitary, erect. Perianth bell-shaped. Stamens short, awl-shaped, with broadly linear anthers. Style short; stigma thick, 3-lobed; ovary and pod triangular.

1. T. Gesneriana L. Common Tulip. Leaves 3–6, ovate-lanceolate, close to the ground. Flower large, on a smooth peduncle, color red, yellow, white, or variegated. Cultivated from Asia Minor. Many garden varieties exist.

XIII. SCILLA L.

Perennial herbs, appearing stemless, from coated bulbs. Leaves linear. Flowers racemed on a scape, generally blue. Divisions of the perianth 1-nerved, parted almost to the base. Filaments 6, often broad at the base. Style slender, with a knob-like stigma. Ovary 3-angled, 3-celled.

1. S. sibirica Andr. Siberian Squill. Scapes 3–8 in. high, several from each bulb, 2–3-flowered. Leaves 2–4, narrowly strap-shaped. Flowers intense blue, short-peduncled, often nodding. Cultivated from Russia and Siberia.

XIV. CAMASSIA Lindl. (QUAMASIA)

Herbs appearing stemless, from coated bulbs. Leaves linear. Flowers racemed on a scape. Perianth of 6 blue or purple spreading sepals. Stamens with thread-like filaments, slightly perigynous. Style thread-like, ending in a knobbed stigma. Capsule 3-angled, 3-celled, several-seeded.

1. C. esculenta Robinson. WILD HYACINTH. Leaves keeled, weak, shorter than the scape. Flowers in a long-bracted raceme, pale blue. River bottoms and other damp, rich soil.

XV. ORNITHOGALUM L.

Herbs appearing stemless, from coated bulbs. Leaves linear, fleshy. Scape erect. Flowers in corymbs or racemes, bracted. Perianth segments 6, white, nerved, persistent. Stamens 6, hypogynous, slender; filaments flattened. Ovary sessile, 3-celled, few-ovuled. Fruit a roundish, 3-angled capsule, seeds black.*

1. O. umbellatum L. STAR OF BETHLEHEM. Bulb ovoid, membranous-coated. Leaves numerous, linear, fleshy; mid-vein nearly white, as long as the scape. Scape slender, 6–12 in. high. Flowers opening in sunshine, long-pediceled. Bracts linear-lanceolate, about as long as the pedicels. Perianth segments oblong-lanceolate, white with a green stripe on the back, twice the length of the stamens. Introduced from Europe; very common about old gardens.*

XVI. HYACINTHUS L.

Herbs appearing stemless, from coated bulbs. Leaves linear, fleshy. Flowers in an erect spike, pediceled, bracted. Perianth tubular below, lobed and spreading above. Stamens short, included. Style short; stigma knobbed; ovary 3-celled, many-ovuled.*

1. H. orientalis L. HYACINTH. Leaves lance-linear, thick and fleshy, smooth. Scape erect, many-flowered. Segments united about half their length, white, blue, or red. Filaments very short. Ovary rarely maturing seed. Common in cultivation.*

XVII. YUCCA L.

Plants with woody and leafy stems. Leaves numerous, rigid, spine-pointed, persistent. Flowers in large terminal racemes

or panicles, bracted, nodding. Perianth bell-shaped; segments 6, nearly alike, deciduous. Stamens 6; filaments thickened above, often papillose; anthers small. Ovary sessile, 3-celled or becoming 6-celled, 3-angled, many-ovuled. Fruit an oblong, 3-angled, many-seeded, dehiscent capsule, or fleshy and indehiscent.*

1. **Y. glauca** Nutt. Bear Grass, Soap Weed. Stem very short. Leaves basal, long, straight and slender, stiff, sharp-pointed, the margins white and with a few thread-like filaments, $\frac{1}{4}$–$\frac{1}{2}$ in. wide. Flowers racemed, greenish-white, globose or oblong, bell-shaped. Style green; capsule large, oblong, six-sided. Dry soil W.

2. **Y. filamentosa** L. Spanish Dagger. Stem stout, 4–12 in. high. Leaves linear or linear-lanceolate, slender-pointed, narrowed above the spreading and clasping base, spreading or recurved, smooth, with loose, thread-like filaments on the margins. Panicle elongated, with bract-like leaves on the scape, widely branched, downy-hairy above, 3–6 ft. high. Perianth white, bell-shaped, 2 in. wide. Capsule oblong, angles rounded, sides furrowed, at length 3-valved and dehiscent. In sandy soil, and often cultivated for ornament.*

XVIII. ASPARAGUS L.

Stem from fleshy, fibrous roots, erect, branched; branches slender, with thread-like branchlets in the axils of scales which take the place of leaves. Flowers small, solitary or racemed. Perianth 6-parted; segments distinct or slightly united. Stamens 6, perigynous; filaments thread-like. Ovary 3-celled, 6-ovuled; style short, slender; stigmas 3, recurved. Fruit a berry.*

1. **A. officinalis** L. Asparagus. Stem succulent and simple, with fleshy scales when young; becoming taller, more woody, and widely branched, when old. Flowers axillary, solitary, or 2 or 3 together on slender, jointed, drooping pedicels, greenish; segments linear. Berry red, few-seeded. Introduced from Europe, common in cultivation, and often escaped.*

XIX. SMILACINA Desf. (VAGNERA)

Perennial, simple-stemmed herbs, with rootstocks. Leaves usually sessile, nerved, alternate. Flowers white, in a terminal raceme. Perianth spreading, 6-parted. Stamens 6, somewhat perigynous; filaments slender; anthers short, facing inward.

Ovary 3-celled, 6-ovuled; style short and stout, with a somewhat 3-lobed stigma. Fruit a 1–2-seeded berry.

1. S. racemosa Desf. False Spikenard. A showy plant with curved stem 1–3 ft. high, downy throughout. Leaves abundant, oval or ovate-lanceolate, taper-pointed. Flowers small, in a compound raceme. Berries pale red, speckled with dark red or purple. Moist thickets.

2. S. stellata Desf. Plant 1 ft. or less in height, nearly smooth. Leaves broadly lanceolate, acute, clasping. Flowers few, larger than in No. 1, in a simple raceme. Berries very dark red. Along river banks.

XX. MAIANTHEMUM Wiggers. (UNIFOLIUM)

Stem low. Leaves 2–3, lanceolate or ovate, with a heart-shaped base. Flowers small, white, solitary or in a simple raceme. Perianth 4-parted. Stamens 4. Ovary 2-celled; stigma 2-lobed.

1. M. canadense Desf. Two-Leaved Solomon's Seal, Wild Lily of the Valley. Plant 3–6 in. high. Leaves very short-petioled. Fruit a globular or ovoid berry, whitish, with brownish-red blotches. Woods and shaded banks N.

XXI. STREPTOPUS Michx.

Herbs with forking stems from a creeping rootstock. Leaves clasping. Flowers small, borne singly or in pairs on peduncles which arise above the leaf axils and which are sharply bent or twisted near the middle. Anthers arrow-shaped. Ovary 3-celled, ripening into a red, many-seeded berry.

1. S. amplexifolius DC. Liver Berry. Stem smooth, 2 ft. or more high. Leaves smooth-margined. Flowers greenish-white. Damp woods.

2. S. roseus Michx. Liver Berry, Jacob's Ladder. Branches with a few bristly hairs. Lower leaves margined with fine bristles. Flowers reddish or purplish. Cold, damp woods N.

XXII. POLYGONATUM Hill. (SALOMONIA)

Rootstock creeping, jointed, scarred. Stems simple, erect, scaly below, leafy above. Leaves alternate, oval or oblong. Flowers on axillary, 1–4-flowered, drooping, jointed peduncles.

Perianth tubular, 6-cleft. Stamens 6, included, inserted about the middle of the tube; anthers arrow-shaped. Ovary 3-celled, many-ovuled; style slender; stigmas knobbed or 3-lobed. Fruit a few-seeded berry.*

1. P. biflorum Ell. HAIRY SOLOMON'S SEAL. Stem simple, erect, arched, nearly naked below, 1–2 ft. high. Leaves 2-ranked, sessile or clasping, 3–7-nerved, smooth above, pale and downy beneath. Peduncles short, 1–4, often 2-flowered. Perianth greenish, 1–2 in. long. Filaments thread-shaped, roughened. Berry dark blue. Shady banks.*

2. P. commutatum Dietrich. SMOOTH SOLOMON'S SEAL. Stem simple, stout, curving above, 3–8 ft. high. Leaves lanceolate to ovate, many-nerved, partly clasping, smooth on both sides. Peduncles nearly half as long as the leaves, 2–6-flowered. Perianth greenish-yellow, $\frac{3}{4}$ in. long. Filaments smooth. Berry blue, $\frac{1}{2}$ in. in diameter. In rocky woods and along streams.*

XXIII. CONVALLARIA L.

Low, smooth, apparently stemless, perennial herbs. Leaves 2, oblong, with long petioles, from a slender, creeping rootstock. Scape slender, angled, inclosed at the base by the leafstalks. Flowers racemed, white, drooping. Perianth bell-shaped, with recurved lobes. Stamens borne on the base of the perianth. Ovary 3-celled, ripening into a few-seeded red berry.

1. C. majalis L. LILY OF THE VALLEY. A familiar garden flower, cultivated from Europe, and also found wild in mountain woods from Virginia to Georgia.

XXIV. TRILLIUM L.

Low herbs, with the stem springing from a short rootstock. Leaves 3, large, netted-veined, in a whorl. Flower large, terminal. Perianth of 6 parts, the 3 sepals unlike the 3 petals in color and in texture. Stamens 6, with the linear anthers usually opening inward, longer than the filaments. Stigmas 3, sessile, spreading at the tips; ovary 3- or 6-angled, 3-celled, many-seeded. Fruit a roundish, many-seeded purple berry.

1. T. sessile L. Rootstock erect or ascending, corm-like. Stem slender, 1–8 in. high. Leaves broadly oval, obtuse or acute at the apex, rounded and sessile at the base, 3–5-nerved, smooth, bright

green, not mottled. Flowers sessile; sepals lanceolate, $\frac{3}{8}$–1 in. long; petals purple, elliptical, about the length of the sepals. Stamens half the length of the petals. Styles elongated, straight. In rich woods.*

2. T. erectum L. Squawroot, Benjamin. Rootstock rather upright, large and stout. Leaves broadly diamond-shaped, tapering to a short point. Pedicel 1–3 in. long, not quite erect. Petals ovate to lanceolate, much broader than the sepals, of a rich brownish-purple or sometimes white or pale. Stigmas distinct, stout, and spreading. The disagreeable scent of the flower has given rise to several absurd popular names for it. In rich woods.

3. T. grandiflorum Salisb. Large-Flowered Wake-Robin. Rootstock horizontal, stem slender, 12–18 in. high. Leaves rhombic-ovate, taper-pointed at the apex, rounded and sessile or slightly peduncled at the base, smooth and with a bloom, 5–7-nerved, bright green. Peduncle longer than the erect or slightly declined flower. Sepals lanceolate-acute, 1–1½ in. long. Petals white, fading to pink, longer than the sepals. Stamens less than half the length of the petals. Style short; stigmas recurved. Fruit a black, roundish berry. In rich woods.*

4. T. cernuum L. Nodding Trillium. Stem 8–20 in. high. Leaves broadly rhombic or rhombic-ovate, 2–4 in. wide, taper-pointed, sessile or nearly so. Peduncle recurved beneath the leaves. Petals white or pink, wavy, somewhat recurved, as long as the sepals or a little longer. Stamens with filaments about equaling the anthers. Stigmas stout, recurved. Rich moist woods.

5. T. nivale Riddell. Dwarf White Trillium. Stem 2–4 in. high. Leaves petioled, oval to ovate. Flower white, erect. Petals ½–1½ in. long, ovate-spatulate. Rich, damp woods, blooming with the very earliest spring flowers.

6. T. undulatum Willd. Painted Trillium. Stem 8–12 in. high. Rootstock oblique to the rest of the stem, rather small; roots long and fibrous. Leaves ovate, taper-pointed. Petals white, penciled at the base, with purple stripes, lance-ovate, somewhat recurved, wavy. Cold woods, especially N.

XXV. SMILAX L.

Mostly woody vines, usually with prickly stems, climbing by tendrils. Rootstock often large and tuberous. Leaves alternate, prominently nerved, netted-veined, petioled; stipules replaced by persistent tendrils. Flowers regular, diœcious, small, greenish, in axillary umbels. Perianth bell-shaped, segments 6. Stamens 6, distinct. Ovary 3-celled, 3–6-ovuled; stigmas 1–3, sessile or nearly so. Fruit a 1–6-seeded globose berry.

1. S. herbacea L. CARRION FLOWER. Stem herbaceous, erect, simple or branched, not prickly, 1–3 ft. high. Leaves few, ovate, acute, and mucronate at the apex, somewhat heart-shaped at the base, 5–7-nerved, thin, smooth above, downy below, the upper sometimes whorled and the lower bract-like; petiole short. Peduncles as long as the leaves, growing from below the petiole. Umbel many-flowered, flowers carrion-scented. Berry blue-black, 2–4-seeded. Dry, fertile soil.*

2. S. Walteri Pursh. GREEN-BRIER. Stem low, with few prickles, 2–5 ft. long; branches slightly 4-angled, unarmed. Leaves oblong-lanceolate to oval, obtuse or acute at the apex, rounded or cordate at the base, 5-ribbed, smooth. Peduncles flattened, about as long as the petioles and pedicels. Berry bright red, ripening the first year. Wet pine barrens.*

3. S. rotundifolia L. GREEN-BRIER, CAT-BRIER, DOG-BRIER, HORSE-BRIER, WAIT-A-BIT. Stem green, strong; branchlets, and sometimes the branches, 4-angled, armed with stout hooked prickles. Leaves ovate or round-ovate, with a slightly heart-shaped base and an abruptly pointed tip. Berries black, with a bloom. Thickets, the commonest species N. E.

4. S. glauca Walt. GREEN-BRIER. Stem cylindrical, slender, with scattered prickles, branches angled and usually without prickles. Leaves ovate or subcordate, pointed at the apex, mostly 5-nerved, smooth, white beneath, with a bloom, margin entire. Peduncle flattened, 2–3 times as long as the petiole, few-flowered. Berry black, 3-seeded. Margin of swamps.*

5. S. Bona-nox L. BAMBOO VINE. Stem stout, cylindrical or slightly angled, scurfy when young, armed with numerous stout prickles. Branches 4-angled, usually unarmed. Leaves triangular, ovate, or often halberd-shaped, 5–7-ribbed, smooth on both sides and often discolored; margins usually fringed with fine prickles. Peduncles twice as long as the petioles, flattened. Umbels many-flowered; pedicels short. Berries 8–20 in a cluster, black, 1-seeded. In swamps and thickets.*

11. AMARYLLIDACEÆ. AMARYLLIS FAMILY

Mostly smooth perennial herbs, from bulbs. Leaves basal, with no distinction between petiole and blade. Flowers borne on a scape, nearly or quite actinomorphic. Stamens 6. Style 1. Limb of the 6-parted, corolla-like perianth epigynous. Ovary 3-celled. Capsule 3-celled, several–many-seeded.

I. NARCISSUS L.

Scapes with 1–several flowers from a thin, dry spathe. Flowers with a cup-shaped or other crown on the throat of the perianth; tube of the perianth somewhat cylindrical, the 6 divisions of the limb widely spreading. Stamens 6, inserted in the tube.

1. N. Psuedo-Narcissus L. DAFFODIL, DAFFY, EASTER FLOWER. Scape short, bearing 1 large yellow flower; tube of perianth short and wide, crown with a crimped margin. Cultivated from Europe.

2. N. Tazetta L., var. **orientalis.** CHINESE SACRED LILY. Bulb large, often with many smaller ones attached to its base. Scape 1 ft. or more high. Flowers several, umbeled, fragrant. Perianth white or nearly so, the crown rather spreading, finely scalloped, yellow or orange. Cultivated from China.

3. N. poeticus L. POET'S NARCISSUS. Scape 1-flowered. Perianth pure white, the crown very narrow, edged with pink. Cultivated from S. Europe.

II. ZEPHYRANTHES Herb. (ATAMOSCO)

Stemless, from a coated bulb. Leaves linear, fleshy. Scape erect, 1–few-flowered. Flowers large, erect, or declined, subtended by a 1–2-leaved spathe. Perianth 6-parted, naked in the throat; tube short, segments petal-like, spreading. Stamens free, anthers versatile. Ovary 3-celled, many-ovuled; style elongated, declined; stigma 3-cleft. Fruit a many-seeded, 3-valved capsule; seeds black, compressed, or angled.*

1. Z. Atamasco Herb. ATAMASCO LILY. Bulbs about 1 in. in diameter. Leaves narrow, concave above, smooth, usually longer than the scape. Scape 6–12 in. high, 1-flowered. Spathe 1-leaved, 2-cleft. Flowers 2–3 in. long, white, tinged with pink or purple, bell-shaped, short-peduncled. Stamens longer than the tube, shorter than the style. Capsule depressed-globose, seeds angled. In rich, damp soil, often cultivated.*

III. HYPOXIS L.

Small, apparently stemless herbs. Leaves grass-like, hairy, from a solid bulb. Scapes thread-like, few-flowered. Perianth 6-parted, wheel-shaped, the 3 outer divisions greenish on the outside, the whole perianth withering on the pod. Seeds numerous.

1. **H. hirsuta** Coville. Star Grass. Leaves longer than the scape, both sparsely set with long, soft hairs. Scape 3–8 in. high. Flowers 1–4, about ½ in. across, yellow. Common in meadows and dry woods.

12. IRIDACEÆ. Iris Family

Perennial herbs from bulbs, corms, or rootstocks. Leaves 2-ranked, equitant. Flowers bisexual, often actinomorphic, each subtended by two bracts. Perianth 6-parted, the segments epigynous in 2 series of 3 each, equal, or the inner ones smaller. Stamens 3, distinct or united, opposite the outer segments. Ovary forming a 3-celled, 3-angled, 3-valved, many-seeded, dehiscent capsule.*

I. CROCUS L.

Leaves springing from the corm. Flowers sessile on the corm. Tube of the perianth very long and slender, its divisions all alike or nearly so. Stigmas 3-cleft.

1. **C. vernus** All. Spring Crocus. Leaves linear. Stigmas short. Flowers white, blue, or purple. Our earliest garden flower. Cultivated from Europe.

II. IRIS L.

Rootstock thick, creeping, branching, horizontal, sometimes tuberous. Stems erect, simple or branched. Leaves linear or sword-shaped. Flowers showy, the outer perianth segments spreading or recurved, often bearded within, the inner segments usually smaller and erect. Stamens inserted in the base of the outer segments. Style deeply 3-parted (Fig. 8), the divisions broad and petal-like, covering the stamens. Fruit an oblong or oval, 3- or 6-angled, many-seeded capsule (Fig. 9).*

1. **I. versicolor** L. Large Blue Flag. Rootstock thick, horizontal. Stem cylindrical, smooth, simple or branched, leafy, 2–3 ft. high. Leaves linear, sword-shaped, finely nerved, with a bloom, the lower 1½–2 ft. long, the upper shorter. Bracts longer than the pedicels. Flowers terminal, single or few together, blue variegated with white, yellow, and purple; perianth segments not bearded, the inner ones smaller. Ovary 3-angled, longer than the inflated perianth tube. Capsule oblong, slightly lobed; seeds 2 rows in each cell. In wet places.*

Fig. 8. Iris

I, flower. II, seed, longitudinal section. III, flower with outer segments of perianth removed: *stig.*, stigma, *ov.*, ovary

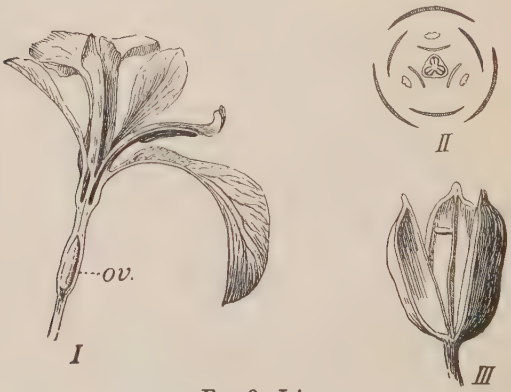


Fig. 9. Iris

I, flower, longitudinal section: *ov.*, ovary. II, diagram showing stigmas opposite the stamens; III, capsule, splitting between the partitions

2. I. prismatica Pursh. Slender Blue Flag. Rootstock rather slender, with tuber-like thickened portions. Stem slender, cylindrical, usually unbranched, 1–3 ft. high. Leaves 2–3 in number, narrowly linear, $\frac{1}{6}$–$\frac{1}{4}$ in. wide. Flowers slender-peduncled, solitary or in twos, blue with yellow veins, the perianth tube beardless and crestless. Ovary 3-angled; capsule sharply 3-angled. Marshy soil near the coast.

3. I. fulva Ker. Yellow Flag. Rootstock fleshy. Stem simple or branched, grooved, 1-angled below, bearing 2–3 leaves, 2–3 ft. high. Leaves linear, sword-shaped, with a bloom, shorter than the stem; bracts small. Pedicels short, flowers axillary and terminal, dull yellow or reddish-brown, variegated with blue and green, perianth segments not bearded. Style branches but little exceeding the stamens; ovary about as long as the inflated perianth tube; capsule ovate, 6-angled. Swamps and wet places.*

4. I. germanica L. Fleur-de-Lis. Rootstock thick, matted. Stem stout, branched, leafy, 2–3 ft. high. Leaves strap-shaped, acute, erect, shorter than the stem; bracts scarious. Flowers sessile, large and showy, blue variegated with white and yellow, sometimes nearly all white; outer segments large, recurved, bearded, the inner narrower, erect, or arched inward. Introduced from Europe; common in gardens and naturalized in many places.*

III. SISYRHINCHIUM L.

Small, grass-like perennials. Stems erect, flattened, or winged. Roots fibrous. Leaves linear or lanceolate. Flowers small, blue, quickly withering, in terminal 2-bracted umbels. Perianth corolla-like, of 6 bristle-pointed segments; tube nearly or wholly lacking. Stamens 3, completely monadelphous. Stigmas 3, thread-like. Fruit a nearly globular, 3-angled capsule. Species too difficult for the beginner; all commonly known as Blue-Eyed Grass.

13. ORCHIDACEÆ. Orchis Family

Perennial herbs with simple stems, often arising from bulbs or tubers. Leaves simple, usually alternate and entire. Flowers bisexual, generally showy, epigynous, zygomorphic, and often of extraordinary shapes. Perianth of 6 divisions. Stamens 1 or 2, united with the pistil; pollen of comparatively

few grains, held together in masses by cobweb-like threads. Ovary 1-celled, containing many (sometimes more than a million) very minute ovules.

The family is a difficult one, and most of the genera are so rare that specimens should not be collected in large numbers for class study. Two of the most familiar genera are *Cypripedium*, or Lady's Slipper, and *Spiranthes*, or Lady's Tresses. Many of the genera are tropical air plants.

SUBCLASS II. DICOTYLEDONOUS PLANTS

Stems composed of bark, wood, and pith; the fibro-vascular bundles in rings; in woody stems which live over from year to year, the wood generally in annual rings, traversed at right angles by medullary rays. Leaves netted-veined. Parts of the flower usually in fours or fives. Cotyledons 2 (rarely none).

14. SALICACEÆ. Willow Family

Dicœcious trees or shrubs, with flowers in catkins, destitute of floral envelopes. Fruit a 1-celled pod, with numerous seeds, provided with rather long and silky down, by means of which they are transported by the wind.

I. SALIX L.

Shrubs or trees, branches usually very slender. Buds with single scales. Leaves usually long and narrow; stipules sometimes leaf-like or often small and soon deciduous. Bracts of the catkins entire. Staminate catkins erect or drooping (Fig. 10); staminate flowers with 2–10, mostly 2, distinct or united stamens. Pistillate catkins usually erect (Fig. 10); flowers with a small gland on the inner side of the bract; stigmas short, 2-lobed. Capsule 2-valved.*

[Thirty or more species of willow are found growing wild in the northeastern and north central states, but they are very hard, even for botanists, to identify.]

1. S. nigra Marsh. BLACK WILLOW. A small tree with very brittle branches. Leaves elliptical or narrowly lanceolate, acute at each end, serrate, short-petioled, downy when young and becoming smooth with age, 2–3 in. long; stipules persistent or deciduous. Staminate catkins 1–2 in. long; the pistillate 2–4 in. long. Stamens 3–7, distinct; filaments soft-hairy below. Capsule twice the length of the pedicel, ovate, taper-pointed, pointed by the prominent style. Along streams and borders of marshes.*

2. S. lucida Muhl. SHINING WILLOW. A large shrub or sometimes a bushy tree 20 ft. high, with smooth bark, yellowish-brown and shining on the twigs. Leaves varying from ovate to lanceolate, usually with very slender tapering points, sharply and finely serrate, firm, green, and glossy on both sides, 3–5 in. long; stipules small, oblong, usually persistent. Catkins borne on short leafy branches, the staminate ones stout, 1–1½ in. long, the pistillate ones slender, 1½–2 in. long, lengthening in fruit to 3–4 in. Stamens usually 5. Capsule narrowly ovoid or cylindrical, pointed, smooth, and shining. Banks of streams, lakes, and swamps. One of the most beautiful willows from the showiness of the staminate catkins and the large glossy leaves.

FIG. 10. White willow (*Salix alba*)

A, staminate catkin, natural size; *B*, pistillate catkin, natural size; *C*, a staminate flower, magnified; *D*, a pistillate flower, magnified. (After Cosson and De Saint-Pierre)

3. S. alba L. WHITE WILLOW, YELLOW WILLOW. A spreading tree 50–80 ft. high, with rough gray bark, yellowish-green on the twigs. Leaves lanceolate, narrowed at the base, with long tapering points, gray or silky-downy on both sides when young, the upper surface (especially in Var. *vitellina*) becoming smooth when old, 2–4 in. long; stipules ovate-lanceolate, deciduous. Catkins on short leafy branches, the pistillate ones slender, cylindrical, 1¼–3½ in. long. Stamens usually 2. Capsule ovoid, pointed. Cultivated from Europe (especially Var. *vitellina*), and

occasionally escaped from cultivation along streams. Very variable and with many hybrids.

4. S. babylonica L. Weeping Willow. A spreading tree, sometimes 60 ft. or more in height, with drooping branches. Leaves narrowly lanceolate, taper-pointed, serrate, slightly downy when young and becoming smooth with age, green above, pale beneath, often 5–7 in. long; petioles short, glandular. Catkins on short lateral branches. Stamens 2. Style almost none. Capsule sessile, smooth. Introduced and cultivated for ornament.

5. S. cordata Muhl. Heart-Leaved Willow. A shrub 4–10 ft. high, with twigs finely downy or smooth. Leaves oblong-lanceolate, taper-pointed, finely and sharply serrate, often tapering but frequently obtuse or somewhat heart-shaped at the base, finely downy when young (especially on the midrib) but smooth when old; sometimes 5 in. long; stipules usually large and conspicuous, unequal-sided, finely serrate, generally persistent. Catkins with bracts at the base, opening earlier than the leaves, the staminate ones very silky, less than 1 in. long, the fertile ones in fruit 1½–2½ in. long. Capsules narrowly ovoid, pointed. In wet soil and along streams, very variable and widely distributed.

6. S. discolor Muhl. Glaucous Willow, Pussy Willow. A low tree, sometimes 20 ft. or more in height, with light greenish-brown or reddish-brown bark. Leaves oblong-lanceolate, tapering at both ends, finely and irregularly toothed or nearly entire, on slender petioles, smooth and firm, bright green above, smooth or silvery white below, 3–5 in. long; stipules often leaf-like, unsymmetrical, usually deciduous. Staminate catkins very white and silky, oblong-cylindrical, 1 in. or more long, appearing much earlier than the leaves; pistillate catkins 1½–2½ in. or more long. Stamens 2, with long, slender filaments. Capsule cylindrical or nearly so, long-beaked. Common in wet meadows or along streams and swamps.

II. POPULUS L.

Trees with prominent scaly buds, twigs more or less angled. Leaves usually long-petioled.

Flowers borne in long, drooping catkins, which appear before the leaves; scales of the catkins irregularly cut toward the tip. Stamens 8–30 or more. Stigmas 2–4. Capsules opening early by 2–4 valves.

1. P. alba L. Silver-Leaved Poplar, White Poplar. A large tree, sometimes more than 100 ft. high, with smooth greenish-gray bark. Leaves broadly ovate, rhombic-oval or nearly orbicular, lobed

or very coarsely toothed, densely white-downy beneath. Cultivated as a shade tree and sometimes found growing spontaneously.

2. P. tremuloides Michx. American Aspen, Quaking Asp. A tree 20–60 ft. high, with greenish-white bark. Leaves roundish, heart-shaped, abruptly pointed, with small regular teeth. Leafstalk long, slender, and flattened at right angles to the broad surfaces of the leaf, causing it to sway edgewise with the least perceptible breeze. Common especially N.

3. P. grandidentata Michx. Large-Toothed Poplar. A tree 60–80 ft. high, with rather smooth gray bark. Leaves 3–5 in. long, roundish-ovate and irregularly sinuate-toothed; when young completely covered with white silky wool, which is shed as soon as the leaf matures. The petiole is somewhat flattened, but not nearly as much so as that of the preceding species. Rich woods N.

4. P. heterophylla L. Swamp Poplar. Branches only slightly angled. Leaves ovate, mostly obtuse at the apex, rounded or subcordate at the base, serrate with obtuse teeth, densely woolly when young, but becoming smooth with age; petioles cylindrical. Pistillate catkins smooth, erect or spreading, loosely flowered. Capsule ovoid, usually shorter than the pedicel. Common in river swamps. A large tree with soft light wood, which is often used in making cheap furniture.*

5. P. deltoides Marsh. Cottonwood. A large and very rapidly growing tree, 75–100 ft. or more high, often with a markedly excurrent trunk. Leaves large and broadly triangular, with crenate-serrate margins and long, tapering, acute tips; petioles long and considerably flattened. The numerous pediceled capsules are quite conspicuous when mature, and the air is filled with the downy seeds at the time when the capsules open. Common W., especially along streams, and planted as a shade tree.

15. MYRICACEÆ. Bayberry Family

Shrubs with alternate, simple, resinous-dotted leaves; monœcious or dicœcious. Flowers in short, bracted catkins; perianth none. Staminate flowers 2–10, stamens hypogynous; pistillate flowers surrounded by 2–6 scales. Ovary 1-celled; style short; stigmas 2.

I. MYRICA L.

Shrubs or small trees with the branches clustered at the end of the growth of the previous season. Leaves short-petioled, entire, lobed or toothed, the margin usually revolute,

without stipules. Perianth none. Staminate flowers in oblong or cylindrical catkins; stamens 2–10, with the filaments united below. Pistillate flowers surrounded by a cup of 2–6 scales; ovary solitary, becoming a 1-celled, roundish drupe or nut, often covered with waxy grains. Whole plant usually fragrant.*

1. M. carolinensis Mill. Waxberry, Bayberry. A spreading shrub or small tree; young branches downy. Leaves lanceolate or oblong-lanceolate, entire or sometimes serrate near the mostly obtuse apex, smooth or downy on the veins beneath, tapering into a short petiole. Flowers mostly dicœcious. Staminate catkins numerous, stamens 4. Pistillate catkins small, bracts slightly 3-lobed, scales of the ovary 4, fringed with hairs; stigmas 2. Fruit very abundant, incrusted with white wax, $\frac{1}{8}$–$\frac{1}{6}$ in. in diameter, sometimes persistent for 2 or 3 years. Common on wet soils, especially near the coast.*

2. M. asplenifolia L. Sweet Fern. A shrub 2 ft. or less in height, with brown twigs. Leaves fern-like, linear-lanceolate, 20–30-lobed, 3–5 in. long and very fragrant. Often monœcious. Staminate catkins cylindrical; pistillate catkins globular. Ovary surrounded by 8 long, linear, awl-shaped, hairy and glandular scales which encircle the ripened fruit. Nut nearly ovoid, smooth, small, but eaten by children.

16. JUGLANDACEÆ. Walnut Family

Trees with alternate, odd-pinnate leaves without stipules. Flowers monœcious, the staminate in long and drooping catkins; stamens few or many; calyx 2–6-parted. Fertile flowers solitary or in small clusters; calyx 3–5-lobed, minute petals sometimes present. Ovary inferior, 1-celled or incompletely 2–4-celled. Fruit (strictly speaking a drupe) with a dry husk inclosing a bony nut.*

I. JUGLANS L.

Staminate catkins cylindrical, solitary, borne on wood of the previous year; stamens numerous, filaments short; calyx 4–6-parted. Pistillate flowers single or a few together on a short peduncle at the base of the growth of the season. Calyx 4-parted. Petals 4, minute, epigynous. Styles 2, short, plumose. Fruit large, roundish or oval, husk fibrous-fleshy, becoming dry, indehiscent; nut bony, very rough.*

1. J. cinerea L. BUTTERNUT. Leaflets 15–19, ovate-lanceolate, taper-pointed at the apex, rounded or slightly unsymmetrical at the base, serrate, downy beneath; petioles, branchlets, and fruit clothed with short, sticky hairs. Fruit often somewhat in clusters, oblong, large. More common northward. Wood less valuable and nut less oily than the black walnut. The English walnut (*J. regia*) is occasionally seen in cultivation. It has 7–11 leaflets and a nearly smooth nut.*

2. J. nigra L. BLACK WALNUT. Leaflets 13–21, ovate-lanceolate, serrate, taper-pointed, somewhat cordate or oblique at the base, nearly smooth above, downy beneath; petioles minutely downy. Fruit usually single, roundish, about 2 in. in diameter. On rich soil, rare near the coast. One of the most valuable of our native trees, the wood being very durable and highly prized for cabinet work.*

II. CARYA Nutt. (HICORIA)

Leaflets serrate. Staminate catkins usually in threes on a common peduncle, or sometimes sessile at the base of the growth of the season; calyx 2–3-parted; stamens 3–10, filaments short. Pistillate flowers 2–5 in terminal clusters; calyx 4-parted; petals none; styles 2 or 4, fringed. Fruit somewhat globular, husk separating more or less completely into 4 valves; nut smooth or angled.*

1. C. illinoensis K. Koch. PECAN. A large tree with rough gray bark, young twigs and leaves downy, nearly smooth when mature. Leaflets 11–15, oblong-lanceolate, acuminate, serrate, scythe-shaped. Staminate catkins nearly sessile, 5–6 in. long. Husk of fruit thin; nut oval or oblong, thin-shelled. River bottoms. Rarely native east of the Mississippi River, but widely planted for its fruit.*

2. C. ovata K. Koch. SHELLBARK HICKORY. A large tree with bark scaling off in long plates; young twigs and leaves downy, becoming smooth with age. Leaflets 5, the lower ones oblong-lanceolate, the upper one longer and obovate, taper-pointed at the apex, narrowed to the sessile base. Inner bud scales becoming large and conspicuous. Staminate catkins in threes. Fruit globose, husk thick, splitting into four sections; nut white, compressed, 4-angled, pointed, thin-shelled. On rich soil; more common N. Wood strong and elastic, but not durable when exposed.*

3. C. laciniosa Loud. BIG SHELLBARK, KING NUT, BULL NUT. A tree 70–90 ft. high, with shaggy bark. Leaflets 7 or 9, the terminal one nearly sessile. Fruit large, ovoid or nearly so, 4-grooved toward the outer end, the husk very thick, nut pointed at each end, $1\frac{1}{2}$–2 in.

long, thick-shelled, with a very sweet kernel. Wood hard and heavy. Common in rich, damp soil W.

4. C. alba K. Koch. Mocker Nut, White-Heart Hickory. A large tree 70–100 ft. high, with close, rough bark; catkins, twigs, and under surfaces of the leaves downy and resinous-scented when young. Leaflets 7–9, oblong-lanceolate or obovate-lanceolate, taper-pointed. Fruit globose or nearly so, with a very thick, hard husk; nut with 4 ridges toward the apex, very thick-shelled, with a small, sweet kernel. On rich hillsides. Wood much like that of *C. ovata*.

5. C. cordiformis K. Koch. Pignut, Swamp Hickory. A medium-sized tree, with rather smooth bark. Leaflets 7–11, lanceolate or oblong-lanceolate. Fruit not large, husk thin; nut globular, with a short point, very thin-shelled; kernel extremely bitter. Moist soil, common in the Middle States.

17. BETULACEÆ. Birch Family

Trees or shrubs with alternate, simple, petioled leaves, with usually deciduous stipules. Flowers monœcious in cylindrical or subglobose catkins. Staminate catkins drooping; flowers 1–3 in the axil of each bract; calyx none or membranous and 2–4-parted; stamens 2–10, distinct. Pistillate catkins drooping, spreading, or erect and spike-like; flowers with or without a calyx; ovary solitary, 1–2-celled; ovules 1–2 in each cell. Fruit a 1-celled nut or a key.*

I. CORYLUS L.

Shrubs with prominently veined, cut-toothed leaves, which are folded lengthwise in the bud. Flowers expanding before the leaves. Staminate flowers in slender, drooping catkins; stamens 8, anthers 1-celled. Fertile flowers several in a cluster or in very short catkins at the ends of the twigs of the season; ovary incompletely 2-celled; style short; stigmas 2; bractlets 2, becoming enlarged and inclosing the single bony nut at maturity.*

1. C. americana Walt. Hazelnut. A shrub 2–5 ft. high; young twigs and petioles covered with brownish, stiff hairs. Leaves not very thin, round-cordate, acute or slightly taper-pointed, irregularly toothed, nearly smooth above, downy below. Involucre longer than

the nut and partially inclosing it, glandular-hairy. Nut subglobose, pointed, edible. On rich soil, borders of meadows and fields, and in oak openings.

2. C. rostrata Ait. Beaked Hazelnut. A shrub 4–8 ft. high. Young twigs near ends smooth. Leaves thin, little if at all heart-shaped, doubly serrate or incised, taper-pointed, stipules linear-lanceolate. Involucre completely covering the nut and prolonged into a beak beyond it. Common N. [The latter species is not nearly as widely distributed as the former; they cannot be readily distinguished from each other until the fruit is somewhat mature. The principal points of difference discernible before the fruit is nearly mature are the hairy twigs of No. 1 and the smooth ones of No. 2, and the fact that No. 1 has buds rounded at the apex and more slender and longer staminate catkins, while No. 2 has buds acute at the apex and thicker and shorter staminate catkins.]

II. OSTRYA Scop.

Small trees with gray bark and very hard wood. Leaves open and concave in the bud and somewhat plaited on the veins. Staminate flowers on slender, drooping catkins, sessile at the end of the growth of the previous season; stamens 3–12, subtended by a bract; filaments forked; anthers hairy. Pistillate flowers surrounded by a tubular bractlet, which becomes large and bladder-like at maturity. Fruit a small, pointed, smooth nut; mature catkins hop-like.*

1. O. virginiana K. Koch. A small tree with brownish, furrowed bark. Leaves ovate, acute, doubly serrate, often inequilateral at the base, short-petioled. Staminate and fertile catkins 2–3 in. long. In rich woods. Often known as "ironwood" and "leverwood."*

III. CARPINUS L.

Trees with thin, straight-veined leaves, which are folded in the bud. Flowers appearing before the leaves. Staminate flowers in slender, drooping catkins, sessile at the end of the growth of the previous season; stamens 3–12, subtended by a bract; filaments forked; anthers hairy. Pistillate catkins spike-like, each pair of flowers subtended by a deciduous bract, and each flower by a persistent bractlet, which becomes large and leaf-like in fruit; ovary 2-celled, 2-ovuled; stigmas 2, thread-like. Fruit a small, angular nut.*

1. C. caroliniana Walt. HORNBEAM. A small tree with smooth and close gray bark; twigs slender. Leaves ovate-oblong, acute or taper-pointed, sharply and doubly serrate, the straight veins terminating in the larger serrations; downy when young and soon becoming smooth. Staminate catkins 1–1½ in. long. Pistillate catkins long-peduncled, 8–12-flowered; bractlets becoming nearly 1 in. long, cut-toothed, the middle tooth much longer than the others. In rich, moist woods. Often known as "blue beech" and "ironwood."*

IV. BETULA L.

Trees with slender, aromatic twigs, and thin, usually straight-veined leaves. Staminate catkins drooping, flowers usually 3 in the axil of each bract; stamens 4, short; anthers 1-celled. Pistillate catkins erect, flowers 2 or 3 in the axil of each bract; ovary sessile, 2-celled; styles 2; bracts 3-lobed; perianth none. Nut broadly winged.*

1. B. lenta L. CHERRY BIRCH. Leaves ovate or oblong-ovate, acute, heart-shaped, finely and doubly serrate, silky when young; petioles about ½ in. long. Staminate catkins clustered, 3–4 in. long. Pistillate catkins sessile, about 1 in. long; cylindrical bracts spreading, acute, smooth. River banks, especially N. A large tree, with aromatic twigs. The oil contained in the bark and twigs is distilled and used as a substitute for wintergreen.*

2. B. lutea Michx. f. YELLOW BIRCH. A large forest tree, sometimes 60–90 ft. high, with yellowish or silver-gray bark, which peels off in extremely thin layers. Leaves ovate or nearly so, usually taper-pointed, rounded or sometimes almost heart-shaped at the base, sharply and finely serrate, somewhat downy on the veins beneath, 3–5 in. long. Staminate catkins 3–3½ in. long; pistillate catkins about ⅔ in. long. Rich woods N., also southward in the mountains.

3. B. nigra L. RIVER BIRCH, RED BIRCH. A medium-sized tree with reddish-brown bark. Leaves rhombic-ovate, acute at the apex, acute or obtuse at the base, sharply and doubly serrate, white-downy below, becoming smoother with age, petioles short. Staminate catkins 2–3 in. long. Pistillate catkins 1–1½ in. long, peduncles short, bracts nearly equally 3-cleft, woolly. River banks, especially S. and W.*

4. B. populifolia Marsh. GRAY BIRCH. A tall shrub or slender, straggling tree, 15–30 ft. high, seldom growing erect, often several trunks springing from the ground almost in contact and slanting away from each other. Leaves triangular, with a long taper point and truncate base, unevenly twice serrate, with rather long, slender petioles, which allow the leaves to quiver like those of the aspen.

Bark scaling off in white strips and layers, but not in nearly as large sheets as that of the rarer canoe birch (*B. papyrifera*). The commonest birch of New England.

5. B. alba L. European White Birch, Cut-Leaved Birch. A tree 50–60 ft. high, often with drooping branches. Leaves triangular-ovate, truncate, rounded or somewhat heart-shaped at

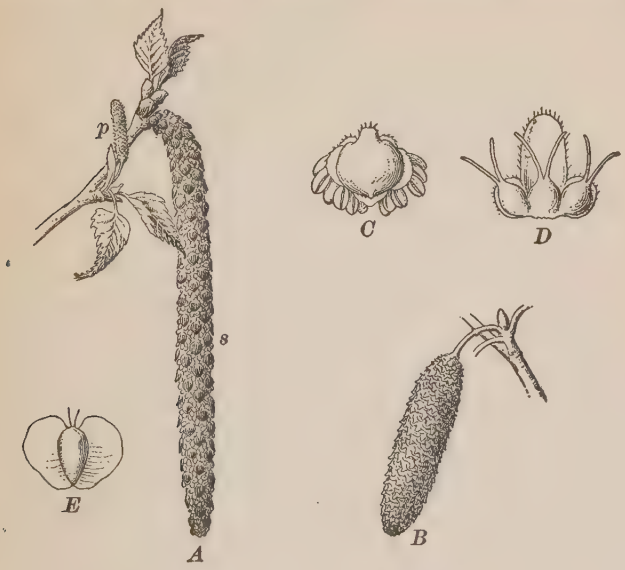


Fig. 11. Gray birch (*Betula populifolia*)

A, catkins, natural size: *s*, staminate; *p*, pistillate. *B*, cluster of ripened fruits; *C*, bract with three staminate flowers; *D*, bract with three pistillate flowers; *E*, fruit. (*B*, *C*, *D*, *E*, somewhat magnified)

the base, not strongly taper-pointed except in the cut-leaved form. Commonly cultivated from Europe. Resembles No. 4, but has whiter bark and (the weeping form) much more slender branches.

Var. **papyrifera.** Canoe Birch, Paper Birch. A large tree, often 60–70 ft. high, with chalky-white papery bark, peeling off in large thin sheets. Leaves ovate, acute or taper-pointed, coarsely serrate or dentate, but entire at the base, dark green and usually without glands on the upper surface, on the lower surface light yellowish-green and nearly smooth, but with tufts of hairs in the

forks of the veins and numerous black glands, 2–3 in. long, with slender petioles. Staminate catkins 3–4 in. long; pistillate catkins 1–1½ in. long, peduncles 2-bracted. Rich soil on hillsides, along streams, and near lakes and swamps, N. and N.E. The beautiful bark is much used by the Indians for canoes, for basket making, and for other purposes.

V. ALNUS Hill

Shrubs or small trees. Leaves petioled, serrate. Flower buds stalked, appearing the previous season; staminate catkins racemed, drooping; flowers 3–6 in the axil of each bract, subtended by 1–2 bractlets; perianth 4-parted; stamens 4; filaments short. Pistillate catkins erect; flowers 2–3 in the axil of each bract; perianth replaced by 2–4 minute bractlets which are adherent to the bract. Ovary 2-celled; styles 2. Fruit a winged or angled nut; bracts of the pistillate flowers somewhat fleshy, persistent, becoming woody in fruit.*

1. A. incana Mœnch. Speckled Alder. A shrub 8–20 ft. high. Leaves broadly oval or ovate, rounded at the base, sharply (sometimes doubly) serrate, white and usually downy beneath. Fruit round. Forming thickets by streams, very common N.

2. A. rugosa Spreng. Smooth Alder. A shrub or small tree with smooth bark. Leaves obovate, rounded or obtuse at the apex, acute at the base, sharply and minutely serrate, smooth above, downy beneath, petioled; stipules oval, deciduous. Staminate catkins 2–4 in. long; fruiting catkins ovoid, short-peduncled. Fruit ovate, wingless. Banks of streams and borders of marshes, ranging far S. Leaves often persistent during the winter.*

18. FAGACEÆ. Beech Family

Trees or shrubs. Leaves alternate, simple, pinnately veined; stipules deciduous. Flowers monœcious, the staminate in heads, or in drooping, spreading, or erect catkins; calyx minute; petals none; stamens 4–20. Pistillate flowers solitary or in small clusters, each flower subtended by more or less united bracts, which at maturity form a cup or bur; calyx minutely toothed; petals none; ovary 2–7-celled, but becoming 1-celled. Fruit a 1-seeded nut.*

I. FAGUS L.

Trees with smooth, close, ash-gray bark, and slender, often horizontal, branches. Staminate flowers in long, slender-peduncled, roundish clusters; calyx bell-shaped, 4–6-cleft; stamens 8–12; anthers 2-celled. Pistillate flowers solitary or more often in pairs, peduncled, surrounded by a 4-lobed involucre and numerous linear bracts; ovaries 3-celled, with 2 ovules in each cell, but usually only 1 ovule maturing in each ovary; styles 3, thread-shaped. Fruit a thin-shelled, 3-angled nut.*

1. F. grandifolia Ehrh. Beech. Large trees. Leaves oblong-ovate, taper-pointed at the apex, serrate, straight-veined, very white-silky when young, nearly smooth with age. Involucre densely covered with short recurved spines. Nuts thin-shelled, edible. Common on damp soil everywhere. The wood is very hard, tough, and close-grained, and is especially valuable for the manufacture of small tools.*

2. F. sylvatica L. The European beech is occasionally found planted as a shade tree. The variety known as the copper beech is most usual, and is readily recognized by its dark, crimson-purple leaves.

II. CASTANEA Hill

Trees or shrubs with rough, gray, rather close bark. Leaves straight-veined, undivided, prominently toothed. Flowers appearing later than the leaves. Staminate catkins erect or spreading, loosely flowered, flowers several in the axil of each bract; calyx 4–6-parted; stamens 8–16. Pistillate flowers at the base of the staminate catkin or in small separate clusters, usually 3 in each involucre; ovary 4-celled, surrounded by 5–12 abortive stamens. Fruit a 1-celled nut inclosed in the greatly enlarged and very prickly involucre.*

1. C. dentata Borkh. American Chestnut. A large tree, bark somewhat rough, and splitting into longitudinal plates. Leaves oblong-lanceolate, taper-pointed at the apex, usually acute at the base, coarsely and sharply serrate with ascending teeth, smooth, dark green above, lighter below; petioles stout, short. Staminate catkins erect, 6–10 in. long. Nuts usually 3 in each bur. Rich soil, especially N. Rarely found on soils containing much lime.*

2. C. pumila Mill. Chinquapin. A small tree or shrub. Leaves oblong, acute or obtuse at both ends, serrate with divergent teeth, dark green and smooth above, white-woolly below. Nuts solitary, nearly globular. Common southward in rich woods.*

III. QUERCUS L.

Trees or shrubs with entire, serrate, or lobed leaves, which are often persistent. Staminate flowers in slender catkins, each subtended by quickly deciduous bracts, and consisting of 3–12 stamens inclosed by a 4–8-parted perianth, often containing an abortive ovary. Pistillate flowers solitary or in small clusters, each consisting of a 3-celled ovary with 2 ovules in each cell, though rarely more than 1 ovule matures; styles short, erect, or recurved. Pistillate flowers surrounded by a scaly involucre which at maturity becomes a cup inclosing the base of the fruit or sometimes a large part of it. Fruit an ovoid or subglobose, 1-seeded, thin-shelled nut (acorn).

A. Fruit annual; leaves not bristle-tipped, though often mucronate.

1. Q. alba L. White Oak. A large tree with light gray bark. Leaves obovate-oblong, 3–9-lobed, lobes rounded and mostly entire, bright green above, paler below, short-petioled. Cup hemispherical, scales rough, woolly when young, but becoming smooth with age; acorn oblong-ovate, about 1 in. long. Common in damp soil. Wood strong and durable; one of the most valuable timber trees.*

2. Q. stellata Wang. Post Oak. A tree of medium size with rough gray bark. Leaves broadly obovate, deeply lyrate-pinnatifid into 5–7 rounded, divergent lobes, upper lobes much the longer, smooth above, yellowish-downy beneath; petioles about 1 in. long. Cup hemispherical, nearly sessile; acorn ovoid, 2–3 times as long as the cup. On dry soil. Wood hard and valuable.

3. Q. lyrata Walt. Swamp Oak. A large tree with gray or reddish bark. Leaves obovate-oblong, deeply pinnatifid, lobes narrow, often toothed, thin, smooth above, white, densely woolly beneath. Cup round-ovate, scales cuspidate, inclosing nearly the whole of the depressed-globose acorn. On wet soil. Wood strong and very durable.*

4. Q. macrocarpa Michx. Bur Oak. A medium-sized to very large tree, with roughish gray bark. Leaves obovate or oblong, lyrately and deeply sinuate-lobed, smooth above, pale and downy beneath. Cup very deep and thick, abundantly fringed about the margin, $\frac{3}{4}$–2 in. in diameter. Acorn, half or more (sometimes entirely) inclosed by the cup. Reaches its full size only on rich bottom lands S. and W., where it becomes one of the finest timber oaks. Wood very hard and heavy.

5. Q. Muhlenbergii Engelm. YELLOW CHESTNUT OAK. A tree of medium or large size with gray bark. Leaves oblong or oblanceolate, usually acute at the apex and obtuse or rounded at the base, coarsely and evenly toothed; veins straight, impressed above and prominent beneath; petioles slender. Cup hemispherical, sessile or short-peduncled, with flat scales, $\frac{1}{2}$ in. broad, inclosing about half the ovoid acorn, which is $\frac{2}{3}$–$\frac{3}{4}$ in. long. Common on dry soil. Wood close-grained, durable, and valuable.

6. Q. Prinus L. SWAMP CHESTNUT OAK. A large tree with brown, ridged bark. Leaves oblong or oblong-lanceolate, rather obtuse, crenately toothed, minutely downy beneath; petioles slender, about 1 in. long. Cup hemispherical, peduncles longer than the petioles, scales acute, tubercular, appressed; acorn oblong, acute, 1 in. or less in length, edible. Common on low ground. Wood strong and valuable.*

7. Q. virginiana Mill. LIVE OAK. A large tree with rough gray or brown bark and a low, spreading top. Leaves leathery, evergreen, oblong or oblanceolate, often somewhat 3-lobed on young trees, margin rolled under, dark green and shining above, pale below; petioles short, stout. Fruit often in short racemes, cup top-shaped, scales closely appressed, hoary, peduncles $\frac{1}{2}$–1 in. long; acorn from subglobose to oblong, the longer form occurring on the younger trees. On low ground near the coast. Wood very hard and durable; valued for shipbuilding.*

B. Fruit biennial; leaves entire or with bristle-pointed lobes.

8. Q. rubra L. RED OAK. A large tree. Leaves oval or obovate, green above, pale and slightly downy beneath; sinuses shallow and rounded, lobes 8–12, taper-pointed; petioles long. Cups saucer-shaped, with fine scales; acorn ovate or oblong, about 1 in. long. Common; wood not valuable; leaves turning red after frost and often remaining on the tree through the winter.

9. Q. velutina Lam. BLACK OAK. A large tree with rough, dark brown outer bark and thick, bright yellow inner bark. Leaves broadly oval, usually cut more than halfway to the midrib, sinuses rounded; lobes about 7, sharply toothed at the apex, smooth above, usually downy on the veins beneath; cup hemispherical or top-shaped, with coarse scales, short-peduncled, inclosing about half the roundish acorn. Common; wood not valuable, but the inner bark used for tanning and dyeing.*

10. Q. falcata Michx. SPANISH OAK. A small or medium-sized tree with leaves 3–5-lobed at the apex, obtuse or rounded at the base, grayish-downy beneath, lobes lanceolate and often scythe-shaped,

sparingly cut-toothed. Cup top-shaped, with coarse scales, inclosing about half the nearly round acorn. Common in dry woods. Foliage quite variable in outline and lobing; bark valuable for tanning.*

11. Q. nigra L. Black-Jack Oak. A small tree; leaves obovate, usually with three rounded lobes at the apex, the lobes bristle-pointed, rounded, or slightly cordate at the base, rusty-pubescent beneath, shining above, coriaceous, short-petioled; cup top-shaped, short-peduncled, with coarse and truncate scales, inclosing about one third of the oblong-ovate acorn. An almost worthless tree, its presence indicating a thin and sterile soil.*

12. Q. phellos L. Willow Oak. A tree of medium size, leaves lanceolate or elliptical, scurfy when young and becoming smooth with age, very short-petioled; cup shallow, sessile; acorn subglobose. Wet soil. Often planted for shade.*

19. ULMACEÆ. Elm Family

Trees or shrubs with watery juice; alternate, simple, petiolate, serrate, stipulate leaves, which are usually 2-ranked; and small, bisexual, or somewhat monœcious, apetalous flowers. Calyx of 3–9 sepals, which are distinct or partly united; stamens as many as the sepals and opposite them. Ovary 1–2-celled; styles 2, spreading. Fruit a key, nut, or drupe.*

I. ULMUS L.

Trees with straight-veined, unsymmetrical, doubly serrate leaves; stipules early deciduous. Flowers bisexual; calyx bell-shaped, 4–9-cleft. Stamens slender, protruding. Ovary compressed; styles 2, spreading. Fruit membranaceous, flat, winged on the edge.*

1. U. fulva Michx. Slippery Elm. A tree of medium size, with rough, downy twigs, and rusty, densely woolly bud scales. Leaves large, thick, very rough above, downy beneath, ovate or obovate, taper-pointed at the apex, unsymmetrical, obtuse or somewhat cordate at the base, coarsely and doubly serrate; calyx lobes and pedicels downy. Fruit broadly oval, downy over the seed, the wing smooth. Inner bark very fragrant when dried, and a popular domestic remedy.*

2. U. campestris L. English Elm. A large tree, with short, rather upright or ascending branches. Leaves not bilaterally symmetrical, oval, acute or sometimes a little taper-pointed, doubly

serrate, 3–4 in. long. Flowers in close clusters with very short pedicels. Fruit obovate-elliptical, with a fissure extending almost to the seed, nearly smooth and not ciliate. Considerably planted as a shade tree and rarely escaped from cultivation. Very variable, one variety with thick ridges of cork on the twigs.

3. U. americana L. White Elm. A large tree with gray bark, drooping branches, and smooth or slightly downy twigs. Leaves oval or obovate, abruptly taper-pointed at the apex, obtuse and oblique at the base, slightly rough above, soft-downy or soon smooth beneath. Flowers in close fascicles; pedicels slender, smooth. Fruit oval or obovate, with 2 sharp teeth bending toward each other at the apex;

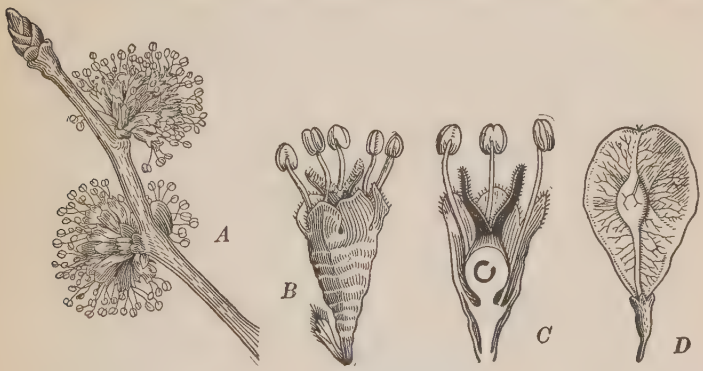


Fig. 12. *Ulmus campestris*

A, a flowering twig; *B*, a flower; *C*, longitudinal section of a flower; *D*, a fruit. (*A*, *D*, natural size; *B*, *C*, enlarged.) (After Wossidlo)

wing reticulate-veined, downy on the margin. In moist, rich soil. A widely planted ornamental tree; wood strong but warping badly, and not durable when exposed.*

4. U. racemosa Thomas. Cork Elm, Rock Elm. A large tree 80–100 ft. high, with the young twigs somewhat downy; the branches often with ridges of cork. Leaves much as in *U. americana*, but smaller and less sharply serrate. Flowers racemed, on thread-like pedicels. Fruit oval, downy on the surface and densely ciliate. In rich soil, especially along river banks. A highly valuable timber tree.

5. U. alata Michx. Winged Elm. A small tree with branches corky-winged. Leaves small, ovate-lanceolate, acute, sharply serrate, base nearly equal-sided, rough above, downy beneath, nearly sessile.

Flowers in small clusters. Fruit oblong, downy on the sides, ciliate on the edges. On rich soil. Occasionally producing a second set of flowers and fruit from September to November.*

II. CELTIS L.

Trees or shrubs with entire or serrate, petioled leaves. Flowers greenish, axillary, on wood of the same season, the staminate in small clusters, the fertile single or 2–3 together.*

1. C. occidentalis L. HACKBERRY. A large or medium-sized tree, having much the appearance of an elm, bark dark and rough. Leaves ovate, taper-pointed at the apex, abruptly obtuse and inequilateral at the base, sharply serrate, often 3-nerved from the base, smooth above, usually somewhat downy below. Fruit a small, dark-purple drupe. On rich soil.

2. C. mississippiensis Bosc. SOUTHERN HACKBERRY. A tree usually smaller than the preceding, bark gray, often very warty. Leaves broadly lanceolate or ovate, long taper-pointed at the apex, obtuse or sometimes heart-shaped at the base, entire or with very few serratures, smooth on both sides, 3-nerved. Fruit a purplish-black, globose drupe.*

20. MORACEÆ. MULBERRY FAMILY

Trees, shrubs, or herbs, usually with milky juice, alternate leaves, large deciduous stipules, and small monœcious or diœcious flowers crowded in spikes, heads, or racemes, or inclosed in a fleshy receptacle. Staminate flowers with a usually 4-lobed calyx, and with as many stamens opposite the lobes; filaments usually inflexed in the bud, straightening at maturity. Pistillate flowers usually 4-sepalous; ovary 1–2-celled, 1–2-ovuled; styles 2; receptacle and perianth often fleshy at maturity.*

I. MORUS L.

Trees or shrubs with milky juice, rounded leaves, and monœcious flowers in axillary spikes. Staminate flowers with a 4-parted perianth, and 4 stamens inflexed in the bud. Pistillate flowers with a 4-parted perianth, which becomes fleshy in the multiple fruit, the pulpy part of which consists of the

thickened calyxes of many flowers; ovary sessile; stigmas 2, linear, spreading; the fleshy perianth inclosing the ovary at maturity.*

1. M. rubra L. Red Mulberry. A small tree. Leaves cordate-ovate, often 3–5-lobed on vigorous shoots, taper-pointed at the apex, serrate, rough above, white, densely woolly beneath. Mature fruiting spikes oblong, drooping, dark red or purple, edible. On rich soil. Wood very durable, bearing exposure to the weather.

2. M. alba L. White Mulberry. A small tree. Leaves ovate, heart-shaped, acute at the apex, rounded and often oblique at the base, serrate or sometimes lobed. Smooth and shining on both sides. Mature fruit light red or white. Introduced and common about old dwellings.*

Fig. 13. *Morus alba*

A, staminate flower, about four times natural size; *B*, cluster of pistillate flowers. (After Warming)

II. MACLURA Nutt. (TOXYLON)

A small tree with milky juice. Leaves alternate, petioled, spines axillary. Flowers dicœcious. Staminate flowers in short axillary racemes; calyx 4-parted; stamens 4, inflexed in the bud. Pistillate flowers in axillary, peduncled, capitate clusters; calyx 4-parted; ovary sessile; style long; calyxes becoming thickened and fleshy in fruit and aggregated into a large, dense, globular head.*

1. M. pomifera Schneider. Osage Orange. A small tree with ridged, yellowish-brown bark. Leaves minutely downy when young, becoming smooth and shining with age, ovate or ovate-oblong, taper-pointed at the apex, obtuse or subcordate at the base, entire, petioled. Staminate racemes about 1 in. long. Pistillate flower clusters about 1 in. in diameter. Fruit yellowish, tubercled, 3–4 in. in diameter. In rich soil. Native in Texas and extensively planted for hedges. Wood very durable when exposed to the weather, and therefore used for fence posts. As the wood does not swell or shrink with changes in its moisture, it is highly valued for wheel hubs, etc.*

III. BROUSSONETIA L'Her.

Small trees with milky juice. Leaves alternate, petioled. Flowers dicœcious; staminate in cylindrical spikes, with a

4-cleft calyx, 4 stamens, and a rudimentary ovary; pistillate flowers in capitate clusters, calyx 3–4-toothed. Ovary stalked; style 2-cleft. Fruit in a globular head.*

1. B. papyrifera Vent. Paper Mulberry. A round-topped tree with yellowish-brown bark. Leaves cordate, often irregularly 2–3-lobed, serrate, rough above, downy beneath, long-petioled. Staminate spikelets peduncled, 2–3 in. long. Pistillate heads stout, peduncled, about 1 in. in diameter. Introduced from Asia and very common S. about old dooryards.*

IV. CANNABIS L.

Coarse herbs with very tough, fibrous bark. Leaves usually opposite, palmately compound. Flowers small, diœcious, greenish, the staminate ones in compound racemes or panicles, the pistillate ones in spikes. Calyx of the staminate flowers of 5 sepals, that of the pistillate flowers of 1 large sepal which covers the ovary and the akene.

1. C. sativa L. Common Hemp. An erect plant, 4–8 ft. high. Leaves large, petioled, of 5–7 lanceolate, irregularly serrate or toothed leaflets. Cultivated from Europe, S. and W., for its fiber, and sometimes runs wild along roadsides in rich soil.

21. URTICACEÆ. Nettle Family

Herbs with watery juice, stem and leaves often clothed with stinging hairs. Leaves undivided, stipulate. Flowers small, greenish, unisexual, apetalous in axillary clusters. Calyx of the staminate flowers 4–5-parted or 4–5-sepalous; stamens as many as the sepals and opposite them; filaments inflexed in the bud and straightening at maturity; anthers 2-celled. Calyx of pistillate flowers 2–4-sepalous; ovary sessile, 1-celled; stigma simple or tufted. Fruit an akene commonly inclosed in the dry, persistent calyx.*

URTICA L.

Annual or perennial herbs. Leaves with stinging hairs, opposite, petioled, several-nerved, dentate or incised, stipulate. Flowers monœcious or diœcious. Calyx of the staminate

flowers 4-parted; stamens 4, inserted around a rudimentary ovary. Pistillate flowers with 4 unequal sepals, the inner ones dilated in fruit; akenes smooth, compressed.*

1. U. gracilis Ait. Slender Nettle. Perennial, slender, with some stinging hairs, 2–6 ft. high. Leaves ovate-lanceolate or narrower, with slender petioles, taper-pointed, sharply serrate, with 3–5-nerves arising from the rounded or sometimes almost heart-shaped base, almost smooth; stipules lanceolate. Flower clusters in branching panicled spikes, longer than the petioles. Flowers diœcious or bisexual.

2. U. urens L. Small Nettle. Annual; stem stout, 4-angled, hairy, 12–18 in. tall, with few stinging hairs; branches slender. Leaves elliptical or ovate, serrate or incised, 3–5-nerved, acute or obtuse at the ends, thin, hairy; petioles often as long as the blades; stipules short. Flower clusters axillary, in pairs, loose, mostly shorter than the petioles. On damp soil in waste places. Naturalized from Europe.

22. SANTALACEÆ. Sandalwood Family

Herbs, shrubs, or trees with entire leaves. Flowers usually small. Calyx 4–5-cleft, its limb epigynous. Corolla wanting. Stamens as many as the calyx lobes and opposite them, inserted on the margin of a fleshy disk. Style 1; ovary 1-celled, with 2–4 ovules borne at the top of a free central placenta. Fruit 1-seeded.

COMANDRA Nutt.

Low, smooth perennials with herbaceous stems, rather woody below, often parasitic. Leaves alternate and nearly sessile. Flowers nearly white, in small umbel-like clusters, bisexual. Calyx bell-shaped at first. Stamens borne on a 5-lobed disk which surrounds the pistil; anthers connected by a tuft of hairs to the calyx lobes.

1. C. umbellata Nutt. Bastard Toadflax. Plant 8–10 in. high, with very leafy stems. Roots attached to the roots of trees, from which they draw nourishment. Leaves oblong or oblanceolate, pale, nearly 1 in. long. Umbel-like clusters about 3-flowered, longer than the leaves. Rocky, dry woods.

23. LORANTHACEÆ. Mistletoe Family

Parasitic shrubs or herbs, leaves opposite, leathery, without stipules. Flowers monœcious or diœcious, clustered or solitary; perianth of both calyx and corolla, or of a calyx only, or sometimes wanting, the limb epigynous; sepals 2–8. Stamens as many as the sepals, and opposite them. Ovary 1-celled; ovule 1. Fruit a berry.*

PHORADENDRON Nutt.

Evergreen, shrubby plants, parasitic on trees; branches greenish, jointed, and very brittle. Leaves leathery. Flowers diœcious, in short jointed spikes. Staminate flowers globular, calyx 2–4-lobed, stamens sessile at the base of the lobes, anthers transversely 2-celled. Stigma sessile. Berry 1-seeded.*

1. **P. flavescens** Nutt. American Mistletoe. Very round, bushy; branches very brittle at the joints, opposite or whorled, 6 in. to 2 ft. long. Leaves flat, leathery, or somewhat fleshy, nearly veinless, obovate, entire, with short petioles. Flowering spikes solitary or 2–3 together in the axils of the leaves. Berry roundish, white, glutinous. Parasitic on many deciduous trees.*

24. ARISTOLOCHIACEÆ. Dutchman's Pipe Family

Herbaceous plants, apparently stemless or with twining and leafy stems. Leaves alternate, without stipules, petioled, mostly roundish or kidney-shaped. Flowers axillary, solitary or clustered, bisexual. Calyx tubular, 3- or 6-lobed, usually colored. Petals none. Stamens 6–12, epigynous. Pistil 1; ovary mostly 6-celled, many-seeded.*

I. ASARUM L.

Perennial, apparently stemless, aromatic herbs, with slender, branching rootstocks. Leaves long-petioled, from kidney-shaped to halberd-shaped. Flowers axillary, peduncled. Calyx actinomorphic, 3-lobed, withering-persistent. Stamens 12, the filaments partially united with the style and usually prolonged beyond the anthers. Ovary 6-celled, with parietal placentæ, many-seeded. Mature capsule roundish, often somewhat fleshy.*

1. A. canadense L. Wild Ginger. Plant soft-hairy. Leaves 2, large, kidney-shaped, on long petioles, with the flower borne on a short peduncle between them. Flower greenish outside, brownish-purple inside. Calyx lobes epigynous, taper-pointed, widely spreading, relaxed at the tip. Rich, shady woods, common N.

2. A. virginicum L. Virginia Asarum. Leaves evergreen, 1–3 to each plant, smooth, mottled, round-cordate, entire, 2–3 in. long and broad; petioles smooth or downy along one side, 3–7 in. long. Flowers nearly sessile, greenish without, dull purple within, $\frac{2}{3}$–$\frac{3}{4}$ in. long; tube inflated below, narrow at the throat, lobes spreading. Rich, shady woods.*

II. ARISTOLOCHIA L.

Erect or twining perennial herbs or woody vines. Leaves alternate, heart-shaped at the base, palmately nerved, petioled, entire. Flowers zygomorphic, solitary, or in small clusters. Calyx perigynous or epigynous, tubular, irregular. Stamens mostly 6, sessile, apparently united to the angled and fleshy 3–6-lobed or -angled stigma. Capsule naked, 6-valved; seeds very numerous.*

1. A. macrophylla Lam. Dutchman's Pipe, Pipe Vine. A tall climber. Leaves dark green, smooth, round-kidney-shaped, sometimes 1 ft. wide. Peduncles 1-flowered, with a single clasping bract. Calyx 1½ in. long, bent into the shape of a pipe, its border abruptly spreading, brownish-purple. Rich woods, often cultivated.

2. A. tomentosa Sims. Dutchman's Pipe. Stem woody, climbing high, branches and leaves densely woolly. Leaves heart-shaped, prominently veined, 3–5 in. long and broad. Flowers axillary, mostly solitary, on slender peduncles. Calyx bent in the shape of a pipe, yellowish-green with a dark purple throat, limb unequally 3-lobed, rugose, reflexed. Anthers in pairs below the 3 spreading lobes of the stigma. Capsule oblong. Stems sometimes 30 ft. long. Rich woods S.*

25. POLYGONACEÆ. Buckwheat Family

Herbs with alternate, entire leaves, and usually with sheathing stipules above the swollen joints of the stem. Flowers apetalous, generally bisexual, with a 3–6-cleft calyx, generally colored and persistent. Fruit a compressed or 3-angled akene, inclosed in the calyx; seeds with endosperm, which does not generally inclose the embryo. Stamens 4–12, on the base of the calyx.

I. RUMEX L.

Coarse herbs, many of them troublesome weeds. Flowers small, usually green or greenish, generally in whorls borne in panicled racemes. Calyx of 6 nearly distinct sepals, the 3 inner ones larger and more petal-like than the 3 outer, and one or more of them usually with a little knob or tubercle on its back. Stamens 6; styles 3; stigmas short, fringed. Fruit a 3-angled akene, closely covered by the 3 inner calyx lobes, enlarged and known as valves.

1. R. crispus L. Yellow Dock. Stout, smooth, 3–4 ft. high. Leaves lanceolate, margins very wavy, acute, the lower more or less heart-shaped. Root long, tapering gradually downward, yellow, very tough. Flowers in whorls crowded in long, straight, slender racemes. Valves roundish-heart-shaped, mostly tubercled. A very hardy weed, naturalized from Europe.

2. R. verticillatus L. Swamp Dock. Perennial. Stem stout, smooth, erect or ascending, 3–5 ft. tall. Lower leaves oblong, obtuse at the apex and usually heart-shaped at the base, long-petioled, often 12–18 in. long; upper leaves narrower and often acute at both ends. Flowers bisexual or somewhat monœcious, in dense whorls; pedicels slender, $\frac{1}{2}$–$\frac{2}{3}$ in. long, tapering downward, reflexed at maturity. Calyx green, the valves broadly triangular, abruptly pointed, reticulated, a distinct long and narrow tubercle on the back of each. Swamps and wet ground.*

3. R. Acetosella L. Sheep Sorrel. Perennial herbs with slender creeping and bud-bearing roots. Stem simple or branched, smooth. Leaves petioled, narrowly halberd-shaped, usually widest above the middle, the apex acute or obtuse; upper stem leaves often nearly linear and not lobed. Flowers dicœcious, small, in terminal, naked, panicled, interrupted racemes. Calyx greenish; the pistillate panicles becoming reddish. Fruit less than $\frac{1}{12}$ in. long, granular, longer than the calyx. A common weed, naturalized from Europe, in dry fields and on sour soils. Foliage very acid.*

II. POLYGONUM L.

Annual or perennial, terrestrial or aquatic herbs, with enlarged joints and simple, alternate, entire leaves; the sheathing stipules often cut or fringed. Flowers bisexual, usually white or rose-colored, each flower or cluster subtended by a membranaceous bract similar to the stipules of the leaves.

Calyx mostly 5-parted, the divisions petal-like, erect and persistent. Stamens 3–9; styles 2–3-parted. Fruit lens-shaped or 3-angled.*

1. P. aviculare L. KNOTGRASS. Annual or perennial. Stem prostrate or ascending, diffuse, smooth, 6–24 in. long. Leaves small, lanceolate or linear-oblong, obtuse, nearly or quite sessile. Sheaths thin and dry, 2–3-cleft or cut. Flower clusters axillary, 1–5-flowered; flowers inconspicuous, nearly sessile. Calyx greenish-white, 5-parted, the lobes with white or colored borders. Stamens 5–8; style 3-parted. Akene 3-angled, not shining. A common weed in dooryards and where the ground is trampled.*

2. P. lapathifolium L. Annual. Stem branching, 1–4 ft. high. Leaves lanceolate or broader, wedge-shaped at the base and tapering from near the base to an extremely slender point, ciliate, varying greatly in length. Sheaths not ciliate or fringed. Spikes oblong to linear, closely flowered, erect or nearly so, $\frac{1}{2}$–2 in. long. Calyx white or pink. Stamens 6; style 2-cleft. Akene ovate, lens-shaped, $\frac{1}{12}$ in. wide or less. In wet soil.

3. P. acre HBK. WATER SMARTWEED. Perennial. Smooth or nearly so; stems erect or ascending, rooting below, 2–5 ft. high. Leaves lanceolate or broader, tapering at both ends, petioled, ciliate, translucent-dotted, acrid, $1\frac{1}{2}$–8 in. long. Sheaths cylindrical, falling early, bristly-fringed. Spikes erect or nearly so, loosely flowered, $\frac{3}{4}$–3 in. long. Calyx whitish-greenish or flesh color. Stamens 8; style usually 3-parted. Akene oblong, lens-shaped, smooth and shining. Swamps and wet soil, especially S.

4. P. Persicaria L. LADY'S THUMB. Annual. Smooth or nearly so. Stem erect or ascending, 6–24 in. high. Leaves lanceolate or narrower, tapering at both ends, usually with a dark triangular or crescent-shaped spot near the center, very variable in length. Sheaths more or less bristle-fringed. Spikes ovoid or oblong, dense, erect, peduncled, $\frac{3}{8}$–2 in. long. Calyx pink or purple. Stamens usually 6; styles 2–3-cleft more than half their length. Akene broadly ovate and lens-shaped, often somewhat triangular, smooth and shining. In waste ground, often a troublesome weed. Naturalized from Europe.

5. P. hydropiperoides Michx. MILD WATER PEPPER. Perennial. Stem smooth, slender, erect, decumbent, or prostrate, 1–3 ft. long. Leaves usually narrowly lanceolate, but variable, acute, ciliate, 2–6 in. long. Sheaths wrinkled, bristle-fringed. Spikes erect, slender, often with the flowers scattered, $\frac{1}{2}$–$2\frac{1}{2}$ in. long. Calyx pale pink, greenish or nearly white. Stamens 8; style 3-parted more than half its length. Akene 3-angled, smooth and shining. In swamps and wet places, especially S.

6. **P. dumetorum** L. False Buckwheat. Perennial. Stems slender, twining, branched, 2–10 ft. long. Leaves ovate, taper-pointed, heart-shaped to halberd-shaped at the base, long-petioled. Stipules cylindrical, truncate. Flowers in axillary, more or less compound and leafy racemes. Calyx greenish-white, the outer lobes winged and forming a margin on the pedicel. Stamens 8. Stigmas 3. Akene 3-angled, black, smooth, and shining. Margins of fields and thickets.*

III. FAGOPYRUM Hill

Smooth annual herbs, with more or less triangular leaves; the sheathing stipules cylindrical or funnel-shaped. Flowers bisexual, white, greenish or tinged with rose color, in terminal or axillary, often panicled, racemes. Calyx petal-like (Fig. 14), 5-parted. Stamens 8. Styles 3, with knobbed stigmas. Akene 3-angled, much longer than the persistent calyx (Fig. 14).

Fig. 14. Buckwheat (*Fagopyrum esculentum*)

A, flower; *B*, section of flower; *C*, fruit. (All somewhat magnified.) (After Marchand)

1. **F. esculentum** Mœnch. Buckwheat. Annual, nearly smooth. Leaves halberd-shaped, 1–3 in. long. Flowers white or nearly so, with 8 yellow nectar-bearing glands between the stamens. Old fields and thickets, escaped from cultivation. Introduced from Europe or western Asia.

26. CHENOPODIACEÆ. Goosefoot Family

Herbs or shrubs. Leaves simple, alternate, without stipules. Flowers small, actinomorphic, either bisexual or more or less monœcious or dicœcious. Calyx free from the ovary. Corolla wanting. Stamens usually 5, opposite the sepals. Styles or stigmas generally 2. Fruit with 1 seed, usually inclosed in a small, bladdery sac, sometimes an akene.

I. SPINACIA L.

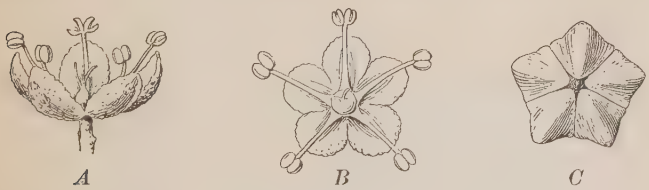
Herbs. Flowers dicœcious, in close axillary clusters. Staminate flowers 3–5-sepaled, with 4 or 5 projecting stamens; pistillate flowers with a tubular 2-toothed or 4-toothed calyx.

1. S. oleracea Mill. SPINACH. A soft annual or biennial herb. Leaves triangular, ovate, or halberd-shaped, petioled. Cultivated from Asia as a pot herb.

II. CHENOPODIUM L.

Annual or perennial herbs. Stems erect or spreading. Leaves alternate, usually white-mealy. Flowers small, greenish, in panicled spikes. Calyx 3–5-parted, the lobes often slightly fleshy and keeled. Stamens 5; filaments thread-shaped. Styles 2–3, distinct or united at the base. Seed lens-shaped.*

1. C. Botrys L. JERUSALEM OAK. A low, spreading plant, covered with sticky down. Leaves with slender petioles, oblong, sinuately



A *B* *C*

FIG. 15. Pigweed (*Chenopodium album*)

A, B, flower; *C*, fruit. (All about seven times natural size)

lobed or the lobes pinnate. Flowers in loose, diverging, leafless racemes. The whole plant is sweet-scented. Introduced from Europe and naturalized in gardens and along roadsides.

2. C. glaucum L. OAK-LEAVED GOOSEFOOT. Annual, succulent, somewhat mealy. Stem spreading, much branched, 5–12 in. high. Leaves varying from oblong to lanceolate, obtuse, some or all of them more or less sinuate-toothed, 1–2 in. long. Flower clusters mostly small axillary spikes. A common weed. Naturalized from Europe.

3. C. album L. LAMB'S QUARTERS. COMMON PIGWEED. Annual, somewhat mealy. Stem erect, usually branching, 1–4 ft. high. Leaves

varying from rhombic-ovate to (the uppermost) nearly linear, narrowed at the base, acute, somewhat angulate-toothed, 1–4 in. long. Spikes terminal and in the leaf axils, often panicled. Calyx with keeled lobes, in fruit nearly covering the smooth seed. A common and troublesome weed. Naturalized from Europe.

4. C. urbicum L. Upright Goosefoot. Annual, little or not at all mealy. Stem stout, erect, and with erect branches, 1–3 ft. high. Leaves halberd-shaped or triangular, acute, coarsely and sharply toothed, except the upper ones, the larger ones 3–6 in. long. Spikes in a narrow, erect panicle. Lobes of the calyx not keeled. Waste ground. Naturalized from Europe.

27. AMARANTHACEÆ. Amaranth Family

Mostly herbs, with nearly the characters of the *Chenopodiaceæ*, but with usually 3 dry, translucent, persistent, often colored, bracts beneath the flower. Most of the genera are tropical; our commonest species are troublesome weeds, usually flowering in midsummer or later.

AMARANTHUS L.

Mostly annual herbs. Leaves alternate, simple, thin, usually entire, often bristle-tipped. Flowers mostly 3-bracted, small, green or purplish in our wild species, in axillary clusters or dense terminal spikes. Calyx of 5 or sometimes 3 distinct erect sepals. Stamens distinct, usually 5, anthers 2-celled. Styles or stigmas 2 or 3. Fruit small, bladdery, 1-seeded, with 2 or 3 beaks formed by the withered styles.

1. A. graecizans L. Tumbleweed. Smooth, pale green. Stem diffusely branched, whitish, the branches slender, ascending. Leaves small, varying from obovate to spatulate, obtuse or retuse, $\frac{3}{8}$–$1\frac{1}{2}$ in. long. Flowers greenish, in small axillary clusters, covered by stiff, sharp-pointed bracts. Sepals 3. In waste ground and a common field and garden weed. In the autumn the leaves drop and the globular stem and branches roll freely about before the wind.

2. A. spinosus L. Spiny Amaranth. Stem stout, ridged, smooth, bushy-branched, often red, 1–4 ft. high. Leaves varying from ovate to lanceolate, tapering to both ends, dull green, $\frac{3}{4}$–3 in. long, each with a pair of stiff spines in its axil. Flower clusters of two sorts,

the upper ones of staminate flowers in long slender spikes, the axillary ones globular, composed of pistillate flowers. Bracts lance-awl-

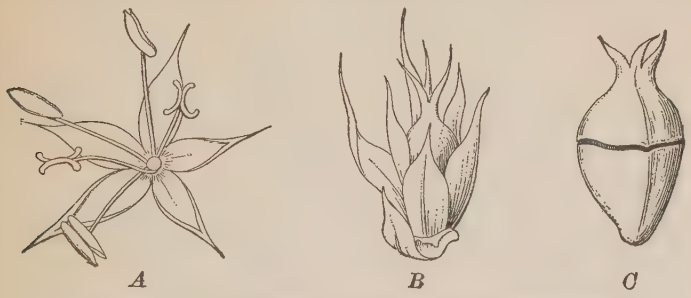


FIG. 16. Prince's feather (*Amaranthus hypochondriacus*)

A, staminate flower; *B*, pistillate flower; *C*, fruit. (All magnified.) (After Schnizlein)

shaped about the length of the 5 sepals. In waste ground, fields, and gardens. Naturalized from tropical America.

A. retroflexus L. and **A. hybridus** L., usually known as pigweed, are common autumn-flowering weeds.

28. PHYTOLACCACEÆ. POKEWEED FAMILY

Plants with alternate entire leaves. Flowers bisexual, 5-parted, with the characters of the Goosefoot Family, but the ovary generally consisting of several carpels, which unite to form a berry.

PHYTOLACCA L.

Perennial herbs. Stems tall, branching. Leaves large, entire. Flowers small, in terminal racemes, pedicels bracted. Calyx of 4–5 nearly equal, persistent sepals. Stamens 5–15, inserted at the base of the calyx. Styles 5–12, recurved at the apex. Fruit a depressed-globose, juicy berry.*

1. P. decandra L. POKEWEED. Stems erect, smooth, branched above, usually dark purple, 4–7 ft. tall; root large, fleshy, poisonous. Leaves ovate-lanceolate, smooth, acute, long-petioled. Racemes peduncled, many-flowered, opposite the leaves; flowers white, becoming purplish. Stamens 10, shorter than the sepals. Styles 10, carpels 10.

Fruit a dark purple berry. A weed on waste ground. The young branches are often eaten like asparagus, and the root, known as "garget root," is used in medicine.*

29. AIZOACEÆ. Ice Plant Family

Mostly fleshy plants, mainly natives of Africa. Flowers often large and showy. Stamens often doubled and some of them petal-like. Ovary 2–many-celled.

[Our only very common genus belongs to a subfamily which has little resemblance to the fleshy "ice plants," found in some gardens, which best represent the family as a whole.]

MOLLUGO L.

Low branching annuals. Sepals 5, greenish outside, white inside. Corolla wanting. Stamens 5, alternate with the sepals, or 3, alternate with the cells of the ovary. Capsule 3-celled, many-seeded.

1. **M. verticillata** L. Carpet Weed. Stems branching and forming radiating patches. Leaves clustered in apparent whorls at the joints of the stem, spatulate. Flowers in little sessile umbels at the joints. Stamens commonly 3. A troublesome weed in sandy soil and common on sandy beaches and river banks.

30. PORTULACACEÆ. Purslane Family

Generally herbs. Leaves opposite or alternate, entire; stipules dry and membranaceous. Sepals 2. Petals 4 or more, distinct or united below. Stamens 4 or more, hypogynous or perigynous. Ovary usually superior, 1-celled; style simple or 3-cleft; ovules 2–many. Capsule opening transversely with a lid, or 2–3-valved.

I. CLAYTONIA L.

Perennial. Stem simple, smooth, erect, 4–10 in. high. Leaves 2, opposite, smooth, succulent. Flowers in a terminal raceme. Sepals 2, ovate, persistent. Petals 5, sometimes joined at the base. Stamens 5, somewhat perigynous. Style 3-cleft; ovary 1-celled, 3–6-seeded.

1. C. virginica L. Spring Beauty. Stem simple, erect from a deep, tuberous root. The 2 stem leaves narrowly elliptical, 3–6 in. long, smooth, fleshy; basal leaves occasionally produced. Flowers on short pedicels. Petals white or pink, with darker veins, $\frac{1}{4}$–$\frac{3}{8}$ in. long, notched. Capsules shorter than the persistent sepals. Common in rich woods.*

2. C. caroliniana Michx. Northern Spring Beauty. Flowers fewer, smaller, and whiter than in No. 1, fragrant. Leaves 1–2 in. long, ovate-lanceolate or spatulate, rather distinctly petioled. Moist woods, especially N.

II. PORTULACA L.

Annual. Stems low, diffuse, and spreading, fleshy. Leaves entire, mostly alternate. Flowers terminal, perigynous. Sepals 2, united at the base. Petals usually 5, quickly withering. Stamens 8–20. Style 3–8-parted. Capsules globose, opening by the upper portion coming off like a lid, 1-celled, many-seeded.*

1. P. oleracea L. Purslane. Stems prostrate, diffuse, fleshy. Leaves alternate, flat, obovate or wedge-shaped. Flowers solitary, sessile, opening in bright sunshine in the morning and usually withering before noon. Sepals broad, acute. Petals yellow. Stamens 10–12. Capsule very many-seeded, seeds small, wrinkled. A common garden weed.*

2. P. grandiflora Hook. Garden Portulaca. Stems fleshy, erect or ascending, densely hairy or nearly smooth, 3–6 in. long. Leaves alternate, cylindrical, fleshy, $\frac{1}{2}$–1 in. long. Flowers 1–2 in. wide, white, yellow, or red, showy, opening only in sunlight. Common in cultivation and often growing spontaneously.*

31. CARYOPHYLLACEÆ. Pink Family

Herbs sometimes woody below, with thickened nodes. Leaves opposite, entire; stipules small and dry or none. Sepals 4–5. Petals 4–5 (rarely 0), usually hypogynous. Stamens usually 8–10, hypogynous or perigynous. Styles 2–5 (rarely 1). Ovules 1–many. Fruit usually a capsule.

A

Sepals distinct or nearly so. Petals (if any) without claws. Capsules several–many-seeded.

Styles usually 3. Capsule ovoid. — **Stellaria, I**

Styles 5 or 4. Capsule cylindrical. — **Cerastium, II**

B

Sepals more or less united. Petals with claws. Capsule several–many-seeded.

(*a*) Calyx without bracts, its lobes long and leaf-like. Agrostemma, III

(*b*) Calyx without bracts, lobes not leaf-like. Styles 3 or 4. Silene, V

(*c*) Calyx without bracts, lobes not leaf-like. Styles 5 (rarely 4). Lychnis, IV

(*d*) Calyx with little bracts at the base. Styles 2. Dianthus, VI

I. STELLARIA L. (ALSINE)

Slender, usually smooth herbs. Flowers small, white, solitary, or in forking cymes. Sepals 5 (rarely 4). Petals 5 (rarely 4), 2-cleft or -divided. Stamens 10 (rarely 8, 5, or 3), maturing in 2 sets. Styles 3 (rarely 4 or 5), opposite the same number of petals; ovary 1-celled, many-ovuled. Capsule short, splitting into as many valves as there are styles.

1. S. longifolia Muhl. Long-Leaved Stitchwort. Stem slender, usually erect, 8–18 in. high, often sharply 4-angled. Leaves linear or nearly so, spreading. Flower clusters peduncled, many-flowered, the pedicels spreading. Petals 2-parted, at length longer than the calyx. Perennial in meadows and grassy thickets, especially N.

2. S. graminea L. Smooth, weak, ascending. Stem sharply 4-angled, 12–20 in. long. Leaves linear-lanceolate or broader, widest a little above the base, ciliate, acute, $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Cyme loose, with slender, widely spreading pedicels. Flowers $\frac{1}{4}$–$\frac{3}{4}$ in. in diameter. Sepals and petals about equal in length, the petals cleft almost to the base. Seeds with many minute tubercles. Fields and roadsides, often among grass. Naturalized from Europe.

3. S. media Cyrill. Common Chickweed. Stem prostrate, 6–18 in. long, with a line or two of hairs along it. Leaves ovate, taper-pointed, the lower petioled, the upper sessile. Petals shorter than the sepals, sometimes wanting. An annual weed, naturalized from Europe, common in damp, shady places N.

II. CERASTIUM L.

Annual or perennial. Stems diffuse, usually downy; leaves opposite. Flowers white, peduncled, in terminal, regularly

forking cymes. Sepals 4–5. Petals 4–5, notched or 2-cleft. Stamens 10. Styles 5 or less. Capsules cylindrical, 1-celled, many-seeded.*

1. C. arvense L. Field Chickweed. Perennial. Stems tufted, erect or ascending, 4–10 in. high. Basal leaves and those of flowerless branches linear-oblong, crowded; those of flowering stems linear or lance-linear. Flowers $\frac{1}{2}$–$\frac{2}{3}$ in. in diameter, in cymes. Petals obcordate, much longer than the sepals. Pods hardly longer than the calyx. In dry or rocky soil.

2. C. vulgatum L. Mouse-Ear Chickweed. Annual or sometimes perennial. Stems diffuse, tufted, clammy-downy, 6–12 in. high. Lower leaves spatulate, the upper oblong, acute, or obtuse; bracts thin and dry. Flowers in loose cymes, pedicels becoming much longer than the calyx. Sepals lanceolate, acute, about as long as the 2-cleft petals. Slender capsule becoming twice as long as the calyx and curved upward. A common garden weed.*

3. C. brachypodum Robinson. Annual. Stems 3–10 in. high, clammy-downy. Lower leaves oblanceolate or spatulate, the upper ones linear to lanceolate. Pedicels shorter or not much longer than the calyx. Petals longer than the sepals. Capsule straight or slightly curved upwards. In dry soil.

III. AGROSTEMMA L.

Annual. Stem pubescent, branching above. Leaves linear-lanceolate or linear, pubescent, sessile. Flowers showy, on long and naked peduncles in terminal corymbs. Calyx tubular, the tube oblong, 10-ribbed; lobes elongated, leaf-like, deciduous. Petals 5, shorter than the calyx lobes, entire. Stamens 10. Styles 5, capsules 1-celled.*

1. A. Githago L. Corn Cockle. Stem erect, rather slender, 1–3 ft. tall, gray, with long, appressed hairs. Leaves linear-lanceolate, acuminate, erect, 2–4 in. long. Petals obovate, notched, purple. Capsule 5-toothed, many-seeded; seeds black. An introduced weed, common in grain fields.*

IV. LYCHNIS L.

Plants with nearly the same characteristics as *Silene*, but usually with 5 styles.

1. L. Coronaria Desr. Mullein Pink. A forking perennial plant, 2 ft. high, covered with white, cottony down. Leaves very wavy,

spatulate; stem leaves ovate-lanceolate, wavy, clasping. Peduncles long, 1-flowered. Flowers about 1¼ in. broad, deep crimson. Calyx tube very strongly 5-ribbed, with 5 smaller ones between; calyx teeth short and slender. Petals somewhat notched. Cultivated in old gardens; from Europe.

2. L. chalcedonica L. Scarlet Lychnis, London Pride. A tall, hairy perennial (about 2 ft.). Leaves lance-ovate, somewhat clasping. Flower cluster flat-topped and very dense. Flowers bright scarlet, not very large. Petals 2-lobed. Common in old gardens; from Japan.

3. L. Drummondii Wats. Perennial, erect, glandular-downy and sticky, 1–3 ft. high. Leaves oblanceolate or linear, acute, ¾–3 in. long. Flowers few, on slender pedicels, white or purplish, ⅜–¾ in. long. Petals not much longer than the tubular calyx. Capsule ½–⅔ in. long. Seeds with little tubercles. In dry soil W.

V. SILENE L.

Annual or perennial herbs. Stems erect or decumbent and diffuse. Leaves often connate or whorled. Flowers clustered or solitary, usually pink or white. Calyx tubular, more or less inflated, 5-toothed, 10-nerved, bractless. Petals 5, long-clawed, and with the ten stamens inserted at the base of the ovary. Styles 3; ovary 1-celled or 3-celled at the base, opening by 6 teeth, many-seeded. Seeds usually roughened.*

1. S. antirrhina L. Sleepy Catchfly. Stem smooth, slender, 8–30 in. high, sticky in spots. Leaves lanceolate or linear. Flowers rather few and small, panicled. Calyx ovoid. Petals inversely heart-shaped, pink, opening only for a short time in sunshine. Dry waste ground.

2. S. Armeria L. Catchfly, None-so-Pretty. A smooth, erect annual or biennial, 6–15 in. high. Several nodes of the stem are usually covered for part of their length with a sticky substance. Leaves very smooth, with a bloom beneath, lanceolate or oblong-lanceolate, clasping. Flowers showy, dark pink, nearly ½ in. in diameter, in flat-topped clusters. Calyx club-shaped. Petals somewhat notched. Cultivated from Europe and introduced.

3. S. noctiflora L. Night-Flowering Catchfly. A tall, coarse annual or biennial weed, covered with sticky hairs. Lower leaves spatulate, upper ones lanceolate, pointed. Flowers large, white, opening at night or in cloudy weather. Calyx teeth long, awl-shaped. Petals 2-parted. In fields and gardens. Naturalized from Europe.

4. S. pennsylvanica Michx. WILD PINK. A perennial with low, clustered stems (4–8 in.). Basal leaves wedge-shaped or spatulate, those of the stem lanceolate. Flowers medium-sized, clustered. Petals wedge-shaped, notched, pink, with a crown at the throat of the corolla. Gravelly soil E.

5. S. virginica L. FIRE PINK. A slender perennial, with erect stem, 1–2 ft. high. Basal leaves spatulate, the upper leaves oblong-lanceolate. Flowers few, peduncled, large and showy, bright crimson. Corolla crowned, petals deeply 2-cleft. Woods.

6. S. latifolia Britten and Rendle. SNAPPERS, RATTLEBOX. A perennial branched herb about 1 ft. high. Leaves opposite, smooth, ovate or ovate-lanceolate. Calyx thin and bladdery, beautifully veined. Petals white, 2-cleft. Capsule nearly globular. In fields and along roadsides, especially eastward. Naturalized from Europe.

VI. DIANTHUS L.

Tufted, mostly perennial herbs, often shrubby at the base. Leaves narrow and grass-like. Flowers solitary or variously clustered. Calyx tubular, 5-toothed, with overlapping bracts at the base. Petals 5, with long claws. Stamens 10, maturing 5 at a time. Styles 2; ovary 1-celled. Capsule cylindrical, 4-valved at the top.

1. D. barbatus L. SWEET WILLIAM. Perennial, often in large clumps. Stems erect, branching above, smooth, 1–2 ft. tall. Leaves lanceolate, 2–3 in. long, acute. Flowers crimson-pink, white or variegated, in terminal clusters; bracts linear, as long as the calyx. Common about old gardens; from Europe.*

2. D. Armeria L. DEPTFORD PINK. Rather erect, annual, with stiff stems 1–2 ft. high. Leaves very dark green, linear, 1–2 in. long, the lower obtuse, the upper acute. Flowers loosely clustered, small, dark pink. Calyx tube $\frac{1}{2}$–$\frac{3}{4}$ in. long, nearly cylindrical. Petals narrow, speckled with very small whitish dots. In sandy fields eastward. Introduced from Europe; sometimes cultivated.

3. D. plumarius L. COMMON PINK, GRASS PINK. Leaves grass-like, with a whitish bloom. Petals white, pink, or variegated, with the limb fringed. Flowers solitary, fragrant. Hardy perennials, cultivated from Europe.

4. D. Caryophyllus L. CARNATION, CLOVÉ PINK. Much like the preceding species, but with larger fragrant flowers; the broad petals merely crenate. Hothouse perennials (some hardy varieties), cultivated from Europe.

32. NYMPHÆACEÆ. Water Lily Family

Perennial aquatic herbs. Leaves usually floating, often shield-shaped. Flowers borne on naked scapes. Floral envelopes and stamens all hypogynous or epigynous. Sepals 3–6. Petals 3–5 or often very numerous. Stamens many. Carpels 3 or more, free or united. Fruit a berry or a group of separate carpels.

I. NYMPHÆA L.

Rootstock horizontal, thick, cylindrical. Leaves heart-shaped, floating or erect. Flowers yellow. Sepals 4–6, green on the outside, obovate, concave. Petals many, hypogynous, the inner ones becoming small and stamen-like. Stamens many, hypogynous. Ovary cylindrical, many-celled; stigma disk-shaped. Fruit ovoid.*

1. **N. advena** Ait. Yellow Pond Lily, Cow Lily, Spatter-Dock. Leaves oval or orbicular, rather thick, often downy beneath. Flowers bright yellow, 2–3 in. in diameter, depressed-globular. Sepals 6. Petals thick and fleshy, truncate. Stamens in several rows; anthers nearly as long as the filaments. In slow streams and still water.*

II. CASTALIA Salisb.

Rootstock horizontal, creeping extensively. Leaves floating, entire, shield-shaped or heart-shaped. Flowers showy. Sepals 4, green without, white within. Petals many, white, becoming smaller towards the center. Stamens many, the outer with broad and the inner with linear filaments. Ovary many-celled, stigmas shield-shaped and radiating. Fruit berry-like, many-seeded.*

1. **C. odorata** Woodville and Wood. White Water Lily. Rootstock large, branched but little. Leaves floating, entire, the notch narrow and basal lobes acute, green and smooth above, purple and downy beneath. Petioles and peduncles slender. Flowers white, very fragrant, opening in the morning, 3–5 in. broad. Fruit globose; seeds inclosed in a membranaceous sac. In ponds and still water.*

2. **C. tuberosa** Greene. Much like No. 1. Rootstock bearing loosely attached, often compound tubers. Leaves round-kidney-shaped, seldom purple beneath. Flowers larger than in No. 1, scentless or nearly so. Slow streams, especially W.

III. NELUMBO Adans.

Rootstock large and stout. Leaves round, shield-shaped, often raised above the water. Flowers large, raised above water at first, but often submerged after blooming. Sepals and petals hypogynous, numerous, the inner sepals and outer petals not distinguishable from each other. Stamens many, hypogynous. Pistils several, 1-ovuled, borne in pits in the flattish upper surface of a top-shaped receptacle, which enlarges greatly in fruit.

1. N. lutea Pers. AMERICAN LOTUS, WATER CHINQUAPIN. Rootstock often 3–4 in. in diameter, horizontal. Leaves 1½–2½ ft. broad, prominently ribbed, with much bloom above, often downy beneath. Petioles and peduncles stout. Flowers pale yellow, 5–9 in. broad. Sepals and petals falling quickly. Fruit top-shaped, 3–4 in. in diameter; the seeds ½ in. in diameter. In ponds and slow-running streams W., introduced from the Southwest.*

33. RANUNCULACEÆ. BUTTERCUP FAMILY

Herbs, rarely shrubs, usually with biting or bitter juice. Leaves basal or alternate (in *Clematis* opposite; stem leaves or involucre whorled in *Anemone*); stipules none or adnate to the petiole. Floral organs all distinct and unconnected. Sepals 5 or more (rarely 2–4), falling early, often petal-like. Petals none, or 5 or more (rarely 3). Stamens many. Carpels many, 1-celled; stigmas simple; ovules 1 or more. Fruit composed of 1-seeded akenes or many-seeded follicles. Seeds small.

A

Flowers zygomorphic.

With a spur. — Delphinium, XII

With a hood. — Aconitum, XIII

B

Flowers actinomorphic.

1. Petals present (in (*c*) not very unlike the stamens).
   - (*a*) Petals very large and showy. — Pæonia, IX
   - (*b*) Petals small, tubular at the tip. — Coptis, X
   - (*c*) Petals narrow, spatulate, on slender claws. — Actæa, XIV
   - (*d*) Petals prolonged backward into spurs. — Aquilegia, XI
   - (*e*) Petals flat, with a little scale at the base, inside. — Ranunculus, I

2. Petals none, or very small and stamen-like.

(*a*) Sepals yellow. Caltha, VIII

(*b*) Sepals greenish or white, falling as the flower opens. Thalictrum, II

(*c*) Sepals white or colored, involucre sepal-like. Hepatica, IV

(*d*) Sepals 4. Plants climbing. Clematis, VI

(*e*) Sepals 5, white. Flowers axillary and terminal. Pods 2–several-seeded. Isopyrum, VII

(*f*) Sepals white or colored. Plants not climbing. Akenes more or less tailed with the styles in fruit. Anemone, V

(*g*) Sepals 5–10, white. Flowers in an umbel. Roots tuberous. Anemonella, III

I. RANUNCULUS L.

Annual or perennial herbs. Leaves alternate, usually deeply lobed or parted. Flowers axillary or in corymbs, white or yellow. Sepals 3–5. Petals 3–5, flat, with a small pit or scale inside at the narrowed base. Stamens usually numerous. Pistils few or several in a head. Akenes flattened, pointed.*

1. R. pusillus Poir. Low Spearwort. Perennial. Stems several, erect or ascending, branched, smooth, 6–15 in. high. Leaves entire or slightly toothed, the lower round or cordate, long-petioled, the upper lanceolate or elliptical, nearly or quite sessile. Flowers very small, about $\frac{1}{6}$ in. wide, yellow. Petals 1–5, as long as the sepals. Stamens 3–10. Akenes smooth, with a very short point. On muddy banks.*

2. R. abortivus L. Small-Flowered Crowfoot. Perennial. Stems smooth, branching, 12–18 in. high. Basal leaves round-cordate, crenate, petioled. Stem leaves 3–5-parted, with wedge-shaped or linear divisions, sessile. Flowers very small, pale yellow. Sepals reflexed, longer than the petals. Akenes in a globose head, smooth, without a beak. Common on wet ground and waste places.*

3. R. recurvatus Poir. Hooked Crowfoot. Perennial. Stem erect, hairy, 1–2 ft. high. Leaves all nearly alike, petioled, 3–5-lobed, with the lobes wedge-shaped, cut or toothed at the apex. Flowers small, pale yellow. Petals minute, shorter than the reflexed sepals. Akenes in a globular head, smooth, with a slender, recurved beak. On low ground.*

4. R. fascicularis Muhl. Tufted Buttercup. Perennial. Stems clustered from thickened fibrous roots, ascending, 5–9 in. high, covered with close-lying silky hairs. Leaves 3–5-divided, the divisions

lobed and cleft into oblong or linear divisions. Flowers about 1 in. in diameter. Petals 5–7, yellow, spatulate-oblong or obovate. Akenes hardly margined, beak slender, straight or slightly curved. On hillsides or in woods or prairies.

5. R. septentrionalis Poir. MARSH BUTTERCUP. Stems smooth or slightly hairy, erect, or in wet ground often forming long runners. Leaves 3-divided, on long petioles, the divisions stalked, cleft or lobed, and wedge-shaped. Petals yellow, obovate, twice as long as the sepals. Akenes flat, strongly margined, beak stout and nearly straight. In moist soil.

6. R. hispidus Michx. RECLINING BUTTERCUP. Perennial. Stems ascending or spreading, densely soft-hairy when young, few-leaved. Leaves pinnately 3–5-divided, with sharply cleft divisions. Flowers $\frac{1}{2}$–$1\frac{1}{2}$ in. in diameter. Petals about twice as long as the spreading sepals. Head of fruit globose or nearly so. Akenes broadly oval, lens-shaped, with a narrow margin. In dry woods and thickets.

7. R. pennsylvanicus L. f. UPRIGHT BUTTERCUP. Perennial. Stems rough-hairy, erect, 2–3 ft. high. Leaves compound in threes, on long and very hairy petioles; leaflets long-stalked, 3-parted, the divisions sharply lobed or toothed. Flowers small. Petals yellow, shorter than the sepals. Akenes flat, smooth, in oblong heads; beak broad and straight. On low ground.*

8. R. bulbosus L. BULBOUS BUTTERCUP, EARLY BUTTERCUP. Stem upright, from a solid bulb about as large as a filbert, about 1 ft. high, hairy. Basal leaves 3-divided, the divisions lobed and cleft. Peduncles furrowed. Flowers large and showy ($\frac{1}{2}$–1 in. in diameter). Sepals strongly reflexed. Petals roundish, wedge-shaped at the base. Akenes with a very short beak. Naturalized from Europe. Common in grass fields in New England.

9. R. acris L. TALL BUTTERCUP. Erect, hairy, 2–3 ft. high. Leaves 3–7-parted, the divisions of the lower ones wedge-shaped, deeply cut and lobed. Peduncles not furrowed. Sepals spreading, downy. Petals obovate, a little smaller and paler yellow than in No. 8. A common weed, naturalized from Europe, in grass fields and elsewhere, especially eastward.

II. THALICTRUM L.

Erect perennial herbs. Leaves compound, with stipules. Flowers in panicles or racemes, often somewhat monœcious or diœcious, wind-fertilized. Sepals 4–5, petal-like. Petals none. Stamens many. Carpels few or many; ovule 1. Fruit a small head of akenes. [The following species are both usually diœcious.]

1. T. dioicum L. Early Meadow Rue. Plant 1–2 ft. high, smooth and pale or with a bloom. Leaves all petioled, most of them thrice compound in threes; leaflets thin and delicate, roundish, 3–7-lobed. Flowers in slender panicles, purplish or greenish; staminate ones with slender, thread-like filaments, from which hang the conspicuous yellowish anthers. Rocky woods and hillsides.

2. T. polygamum Muhl. Tall Meadow Rue. Stems from fibrous roots, tall and coarse, nearly or quite smooth, 4–8 ft. tall. Leaves twice compound, those of the stem sessile, the others long-petioled; leaflets oval or oblong, often cordate, smooth or downy beneath, quite variable in size on the same plant. Flowers small, in large panicles. Sepals 4 or 5, white. Filaments club-shaped. Akenes short-stalked. Thickets and meadows E.

III. ANEMONELLA Spach. (SYNDESMON)

Small, perennial herbs. Leaves compound, smooth, the basal ones long-petioled, those of the stem sessile. Flowers in a terminal umbel, slender-pediceled. Sepals petal-like. Petals none. Pistils 4–15; stigmas sessile, truncate.*

1. A. thalictroides Spach. Rue Anemone. Stem slender, 6–10 in. high, from a cluster of tuberous roots. Basal leaves long-petioled, twice compound in threes; leaflets oval, heart-shaped, 3–5-lobed. Stem leaves 2–3 compound in threes, whorled, the long-stalked leaflets veiny, forming an involucre of 6–9 apparently simple leaves. Flowers 3–6 in an umbel, ½–¾ in. wide; sepals 6–10, white. In rich woods.*

IV. HEPATICA Hill

Involucre of 3 small, simple leaves, so close to the flower as to look like a calyx. Leaves all basal, 3-lobed, heart-shaped, thick, and evergreen, purplish-red beneath. Flowers single, on rather slender hairy scapes.

1. H. triloba Chaix. Round-Lobed Hepatica. Lobes of the leaves obtuse or rounded; those of the involucre obtuse; sepals 6–12, varying from blue to white.

2. H. acutiloba DC. Sharp-Lobed Hepatica. Closely similar to the former, except for the acute lobes of the leaves and tips of the involucre.

[Both species have many local names, such as Liverleaf, Liverwort, Noble Liverwort, Spring Beauty.]

V. ANEMONE L.

Perennial herbs, usually with basal leaves, and 2 or 3 opposite or whorled stem leaves, constituting an involucre some distance below the flower or flower cluster. Sepals few or numerous, colored and petal-like. Petals usually wanting. Akenes pointed, or with long, feathery tails.

1. A. patens L., var. **Wolfgangiana.** Pasque Flower. Low plants, 1 in.–1 ft. high, clothed with long, silky hairs. Leaves divided in threes. Flower single, large, showy, pale-purplish, borne on a peduncle developed before the leaves. Carpels many, with long, hairy styles, which in fruit form tails 2 in. long. Prairies and bluffs, N.W.

2. A. caroliniana Walt. Carolina Anemone. Stem simple, from a roundish tuber, slightly downy, 6–12 in. high, bearing a single flower about 1 in. broad. Basal leaves 2–3, long-petioled, compound in threes, the divisions cut or lobed; stem leaves sessile, compound in threes, the divisions wedge-shaped. Sepals 12–20, white; head of fruit becoming oblong; akenes woolly. In open woods W.*

3. A. cylindrica Gray. Long-Fruited Anemone. Plants about 2 ft. high, branching, with an involucre of long-petioled, divided, and cleft leaves, from within which spring several long, naked peduncles. Flowers greenish-white. Sepals obtuse. Head of fruit cylindrical, composed of very many densely woolly akenes. Dry woods and prairies.

4. A. virginiana L. Plant hairy, 2–3 ft. high. Peduncles 6–12 in. long, sometimes forking, the first ones naked, the later ones with a little 2-leaved involucre at the middle. Leaves of the involucre 3, each 3-parted, the divisions ovate-lanceolate, pointed. Sepals acute. Head of fruit ovoid. Woods and meadows.

5. A. canadensis L. Plant hairy, rather low. Peduncle arising from a 3-leaved primary involucre, then branching, each branch bearing at the middle a 2-leaved secondary involucre. Leaves of the primary involucre broadly wedge-shaped, 3-cleft, the divisions cut and toothed. Sepals obovate, white. Head of fruit spherical. In low ground or woods.

6. A. quinquefolia L. Wind Flower, Wood Anemone. Stem simple, from a thread-like rootstock; involucre of 3 leaves, each petioled, and of 3 leaflets, which are cut, toothed, or parted. Peduncle 1-flowered. Sepals 4–7, white, often tinged with purple outside. Carpels 15 or 20. This species is very nearly related to, but now regarded as distinct from, the European *A. nemorosa.*

VI. CLEMATIS L.

Perennial herbs or slightly woody vines, usually climbing by the leafstalks. Leaves opposite, simple or compound. Sepals 4, petal-like. Petals very small or wanting. Pistils numerous, tipped by the persistent styles, which often become long and plumose in fruit.*

1. C. crispa L. Marsh Clematis. Stem climbing, a little woody below, slightly downy above, 3–5 ft. high. Leaves pinnately compound; leaflets 5–7, varying from lanceolate to ovate, thin, entire or 3–5-lobed. Flowers showy, perfect, solitary, on long axillary peduncles. Sepals lanceolate, taper-pointed, thick, wavy on the margins, twice the length of the stamens, light bluish-purple, 1–1½ in. in length. Tails of the ripened akenes 1 in. long, silky. Rich woods and river banks S.*

2. C. Viorna L. Leather Flower. Stem climbing, nearly smooth, 6–10 ft. long. Leaves usually pinnately compound, the lowest pair often compound in threes and the upper pair simple. Leaflets usually 5–7, oblong-ovate or oval, acute, firm, entire or lobed. Calyx bell-shaped, nodding; sepals ovate, taper-pointed with a short, recurved point, thick and leathery, reddish-purple, 1 in. long. Tails of the akenes plumose, 1½ in. long, brownish. On river banks and rich soil.*

VII. ISOPYRUM L.

Small, smooth herbs. Leaves 2–3 times compound, in threes; the leaflets 2–3-lobed. Flowers peduncled, white. Sepals 5, petal-like, soon falling. Petals wanting (in our species). Stamens 10–40. Pistils 3–6 or more.

1. I. biternatum T. & G. A delicate, erect plant, with alternate branches, looking much like *Anemonella*, with clustered stems from perennial tuberous roots. Damp woods.

VIII. CALTHA L.

Smooth perennials with large, roundish leaves. Sepals petal-like, 5–9. Petals none. Pistils 5–10, each consisting of a 1-celled ovary with a nearly sessile stigma. Fruit a many-seeded follicle.

1. C. palustris L. Marsh Marigold, Cowslips, Meadow Buttercup (both the latter unsuitable names, but in common use). Stem hollow, smooth, ascending; leaves smooth, roundish and heart-shaped,

or kidney-shaped, with crenate, dentate, or nearly entire margins; the broad oval sepals bright yellow. Swamps or wet ground.

IX. PÆONIA L.

Perennial, from thick, fleshy roots; stems shrubby or herbaceous. Leaves much divided. Flowers terminal, large and showy. Sepals 5, leaf-like and persistent. Petals 5 or more. Pistils 3–5; ovaries surrounded by a disk.*

1. P. officinalis L. Garden Peony. Herbaceous; flowering stems 1–2 ft. high. Leaves ample; leaflets lance-ovate, cut or incised, smooth. Flowers double, white or red. Follicles 2, erect, many-seeded. Common in gardens.*

X. COPTIS Salisb.

Low, smooth perennials, with 3-divided basal leaves. Flowers small, white, on scapes. Sepals 5–7, petal-like, soon falling. Petals 5–7, small, club-shaped, tubular at the apex. Stamens 15–25. Pistils 3–7, stalked. Pods thin and dry, 4–8-seeded.

1. C. trifolia Salisb. Gold Thread. A pretty, delicate plant, with slender, 1-flowered scapes, from long, bright-yellow, thread-like rootstocks, which are bitter and somewhat medicinal. Leaves later than the flowers, each of 3 wedge-shaped leaflets, which finally become shining and evergeen. Damp, cold woods and bogs.

XI. AQUILEGIA L.

Perennials, with leaves twice or thrice palmately compound, the divisions in threes.

Sepals 5, petal-like, all similar. Petals 5, all similar, each consisting of an expanded portion, prolonged backward into a hollow spur, the whole much longer than the calyx. Pistils 5, forming many-seeded pods.

1. A. canadensis L. Wild Columbine. Flowers scarlet without, yellow within, nodding; spurs rather long.

2. A. vulgaris L. Garden Columbine. Flowers often double, and white, blue, or purple. Spurs shorter and more hooked. Cultivated from Europe, and sometimes become wild.

XII. DELPHINIUM L.

Annual or perennial herbs. Stem erect, simple or branched. Leaves alternate, petioled, palmately divided. Flowers in

terminal racemes or panicles, showy. Sepals 5, colored, irregular, the upper one prolonged into a spur. Petals 4, unequal, the two upper ones with long spurs which are inclosed in the spur of the upper sepal, the other two short-stalked. Pistils 1–5; ovaries many-seeded.*

1. **D. tricorne** Michx. Dwarf Larkspur. Perennial. Stem simple, from a tuberous root, usually low (½–1 ft. high), but sometimes 2 ft. high. Leaves deeply 5-parted, the divisions irregularly 3–5-cleft. Racemes few-flowered, loose. Flowers blue, sometimes white. Pods diverging. Southward.

2. **D. azureum** Michx. Blue Larkspur. Perennial. Stem usually simple, slender, downy, 1–2 ft. high. Leaves 2–3 in. wide, 3–5-parted, the divisions cleft into 3–5 narrow, toothed, or entire lobes. Flowers in a strict, many-flowered, terminal raceme, showy, blue or whitish. Spur ascending, curved; lower petals bearded, 2-cleft. Pods erect. On rich or rocky soil in open places, N.*

XIII. ACONITUM L.

Erect, perennial herbs. Leaves alternate, palmately lobed or cut. Flowers irregular, in panicles or racemes. Sepals 5, the back one large, arched, and hooded, the front one the narrower. Petals 2–5, small, the 2 back ones clawed and covered by the hood of the sepals; 3 lateral ones small or wanting. Follicles 3–5. Seeds many, wrinkled.

1. **A. Napellus** L. Monkshood. An erect, poisonous plant, 1–2 ft. high. Raceme simple and densely flowered. Flowers dark blue. Cultivated from Europe.

Several native species of *Aconitum* occur within our limits, but they are not common.

XIV. ACTÆA L.

Perennial. Stem simple. Leaves 2–3, compound in threes; leaflets ovate, sharply cut or toothed. Flowers white, in a short and thick terminal raceme. Sepals 4–5, soon deciduous. Petals 4–10, small. Pistil single; stigma 2-lobed. Fruit a many-seeded berry.*

1. **A. rubra** Willd. Red Baneberry. Stem about 2 ft. high. Raceme ovoid or hemispherical. Petals acute. Pedicels slender. Berries usually red, sometimes white, ovoid. Common N.

2. **A. alba** Miller. Baneberry. Stem erect, smooth or nearly so, 18–24 in. high. Leaves large and spreading; leaflets thin. Racemes very broad. Petals slender, truncate. Pedicels red, thickened in fruiting; berries white. In rich woods, more common S.*

34. BERBERIDACEÆ. Barberry Family

Herbs or shrubs. Leaves alternate, simple or compound, usually without stipules. Sepals petal-like. Petals hypogynous, distinct, their number some multiple of 2, 3, or 4, never of 5. Stamens usually one opposite each petal; anthers commonly opening by 2 uplifted lids (the stamens of *Podophyllum* are exceptional). Pistil 1, 1-celled; ovules 2 or more. Fruit a berry or capsule.

I. PODOPHYLLUM L.

Perennial. Stem simple, smooth, erect, 12–15 in. tall, bearing 2 leaves with a large white flower between them. Sepals 6, falling off as the flower opens. Petals 6–9, obovate. Stamens twice as many as the petals; anthers splitting open lengthwise. Pistil 1; stigma large, flat, sessile. Fruit berry-like, 1-celled, many-seeded.*

1. **P. peltatum** L. May Apple. Rootstock rather large. Leaves orbicular, shield-shaped, 5–9-lobed and toothed, smooth, 9–12 in. wide. Flowers 1–2 in. wide, on a peduncle 1–2 in. long. Stamens prominent; anthers opening longitudinally. Fruit 1½–2 in. long, oval, fragrant, edible; each seed surrounded by a pulpy covering. In rich woods. The roots and leaves are used in medicine.*

II. CAULOPHYLLUM Michx.

A perennial smooth herb, 1–2½ ft. high. Leaf large, single, sessile, thrice compound in threes, borne high up on the stem; there is also a large, very compound basal leaf. Flowers racemed or panicled, yellowish-green. Sepals 6, with 3 bractlets. Petals 6, gland-like, somewhat curved inward at the tip, much smaller than the sepals. Pistil 2-ovuled, the ovary soon bursting open and leaving the 2 blue seeds to ripen naked.

1. **C. thalictroides** Michx. Blue Cohosh, Pappoose Root. Whole plant purplish and covered with a bloom when young. Flowers appearing before the leaf is fully developed. Rich woods.

III. BERBERIS L.

Spiny shrubs with yellow wood. Leaves spinous-toothed, jointed on the very short petiole, often reduced to 3–7-cleft spines. Flowers in racemes, solitary or in pairs. Sepals 8–9, the outer minute. Petals 6, each with 2 nectar glands at the base. Stamens 6. Ovules few. Berry 1–2-seeded ; seeds bony-coated.

1. B. vulgaris L. Common Barberry. A shrub 4–6 ft. high. Leaves obovate, spinous-serrate; those on the old shoots mere spines. Flowers pale yellow, in drooping racemes. Stamens irritable, closing quickly toward the center of the flower when touched. Berry ½ in. long, nearly ellipsoidal in shape, scarlet or orange-scarlet, very acid, eatable when cooked. Cultivated from Europe and introduced in eastern New England and locally in the upper Mississippi Valley.

2. B. Thunbergii DC. A low shrub. Leaves entire, turning red and remaining so for a considerable time in autumn. Flowers solitary or in pairs. Berries bright red, remaining on the branches all winter. Cultivated from Japan.

35. MAGNOLIACEÆ. Magnolia Family

Trees or shrubs. Leaves alternate, not toothed or serrate. Flowers solitary, large and showy. Floral envelopes and stamens hypogynous. Calyx and corolla colored alike, the parts of the perianth forming 3 or more circles of 3 parts each. Stamens many. Carpels many, usually joined over the long receptacle and forming a sort of cone-shaped fruit, which may be either fleshy or dry.

I. MAGNOLIA L.

Aromatic trees or shrubs. Leaves alternate, often in clusters at the ends of the branches, entire, usually thick and leathery ; stipules large, quickly deciduous. Flowers terminal, showy, bisexual. Sepals 3, caducous. Petals 6–12, in 2–4 rows, concave. Stamens numerous. Ovaries numerous, 1-celled, 2-seeded, the mature follicles opening at the beak and the fleshy seeds remaining for some time suspended by slender threads.*

1. M. virginiana L. Sweet Bay. A small tree with light gray bark. Leaves scattered on the branches, evergreen, thick and leathery, oval or oblong, smooth and green above, white and with

a bloom, downy beneath, 4–6 in. long. Flowers white, fragrant, 2–3 in. in diameter; petals 9, concave. Cone 1½–2 in. long, pink. Common in swamps and along streams, New York and southward (a few in eastern Massachusetts). The leaves often used in flavoring soups, etc.

2. M. acuminata L. Cucumber Tree. A tree 60–90 ft. high. Leaves thin, oblong or oval, acute, light green and somewhat downy beneath, 5–10 in. long. Flowers oblong-bell-shaped, greenish-yellow, 2 in. long. Petals much longer than the sepals. Cone of fruit 2–3 in. long, often curved, cylindrical. Woods, especially S.

3. M. macrophylla Michx. Large-Leaved Umbrella Tree. A small tree with gray bark. Leaves clustered at the ends of the branches, oblong or obovate, obtuse at the apex, cordate at the base, green and glabrous above, white and downy beneath, 1½–3 ft. long; petioles stout. Flowers white with a purple center, fragrant, 8–12 in. wide. Petals oblong, obtuse, two or three times as long as the sepals. Cone ovate, 4–6 in. long, bright red at maturity. Shady woods on light soil S.*

4. M. Fraseri Walt. Ear-Leaved Umbrella Tree. A small tree with a slender trunk and widely spreading branches. Leaves clustered at the ends of the branches, deciduous, oblong or obovate, contracted, cordate and eared at the base, smooth on both sides, 8–12 in. long; petioles slender. Flowers white and fragrant, 6 in. broad. Petals longer than the sepals, spatulate or oblong, obtuse at the apex, narrowed at the base. Cone 3–4 in. long, pink at maturity. In rich woods S.*

II. LIRIODENDRON L.

A large tree with rough, dark-colored bark. Leaves scattered on the branches, deciduous, 3-lobed, truncate, stipuled, petioled. Flowers bisexual. Sepals 3, reflexed. Petals 6, erect. Stamens numerous. Ovaries numerous, 2-ovuled, joined over each other on the elongated receptacle, never opening, deciduous.*

1. L. tulipifera L. Tulip Tree. The largest tree in the family. Leaves roundish in outline, mostly 3-lobed, the terminal lobe truncate or broadly notched, usually heart-shaped at the base, smooth, green above, lighter beneath; petioles slender. Flowers terminal, bell-shaped, greenish-yellow marked with orange. Petals obovate, obtuse, about as long as the sepals. Mature cones ovate, acute, 2–3 in. long. Common on low ground, Pennsylvania and S. Often called "white wood," or, incorrectly, "white poplar." Wood valuable for making boxes and light furniture.*

36. CALYCANTHACEÆ. Calycanthus Family

Shrubs. Leaves opposite, entire, without stipules. Flowers solitary, often sweet-scented. Sepals and petals numerous, the outer sepals bract-like. Stamens many, short, the inner ones usually sterile. Ovaries several, inserted on the inside of an irregular, hollow, pear-shaped receptacle something like a large rose hip, forming 1-seeded akenes in fruit.

CALYCANTHUS L. (BUTNERIA)

Shrubs, 4–8 ft. tall; branches opposite. Leaves oval, downy beneath, short-petioled; both leaves and bark aromatic. Sepals and petals many, in several rows, somewhat fleshy, indistinguishable. Pistils several, inserted on the inner side of the persistent calyx tube. Mature fruit pear-shaped, dry, inclosing the akenes.*

1. C. floridus L. Sweet-Scented Shrub, Strawberry Bush, Spice Bush, Shrub. A widespreading bush, 4–8 ft. high; twigs downy. Leaves oval or oblong, acute or taper-pointed, rough above, downy beneath, 2–3 in. long. Flowers 1 in. wide, brownish-purple, very fragrant. Sepals united below to form a cup, on the inside of which the other parts of the flower are inserted; cup leafy-bracted on the outside. Banks of streams and rich hillsides S., often cultivated.*

37. ANNONACEÆ. Papaw Family

Trees or shrubs. Leaves alternate, entire, pinnately veined. Flowers bisexual, hypogynous, axillary, solitary. Calyx of 3 sepals; corolla of 6 thickish petals in 2 rows. Stamens many; filaments very short. Pistils several or many, becoming fleshy or pulpy in fruit.

ASIMINA Adans.

Shrubs or small trees. Leaves deciduous. Flowers nodding. Sepals 3, ovate. Petals 6, the 3 outer ones larger and spreading. Stamens very numerous, crowded on the globular receptacle. Ovaries 3–15, sessile, 1-celled, several-ovuled. Fruit a large, fleshy, oblong berry; seeds large, horizontal.*

1. A. triloba Dunal. PAPAW. A small tree, 10–20 ft. high; bark nearly smooth, lead-colored. Leaves oblong-obovate, acute at the apex, obtuse at the base, rusty-downy when young and becoming smoother with age, 6–10 in. long. Flowers on branches of the previous season, appearing before or with the leaves; the short peduncles and the sepals brown-downy; petals purple, obovate, 3–4 times longer than the sepals. Fruit 3–5 in. long, edible when ripe. Common on banks of streams, especially S. and S.W. The bark is very tough and is often used in the place of rope.*

38. LAURACEÆ. LAUREL FAMILY

Aromatic plants, nearly always trees or shrubs. Leaves alternate, simple, usually entire, and marked with translucent dots. Calyx regular, hypogynous, of 4 or 6 colored sepals. Stamens in 3 or 4 circles of 3 each, the anthers opening by valves. Style single. Fruit a 1-seeded berry or drupe.

I. SASSAFRAS Nees.

A tree with rough, yellowish bark and a spreading top. Leaves deciduous, entire or 2–3-lobed. Flowers dicœcious, involucrate, at the end of the twigs of the previous season. Calyx 6-parted, persistent in the pistillate flowers. Stamens 9, in 3 rows. Pistillate flowers with 4–6 abortive stamens and a single ovary. Fruit a drupe.*

1. S. variifolium Ktze. SASSAFRAS. A tree, usually small and slender, but sometimes with a trunk 3 ft. in diameter and 125 ft. high. Leaves oval, entire, mitten-shaped or 3-lobed, downy when young but becoming smooth with age, dark green above, paler below, petiolate. Racemes several in a cluster, peduncled; flowers yellow. Stamens about as long as the sepals. Fruit dark blue, ovoid, on thickened red pedicels. All parts of the tree aromatic. Trees producing pistillate flowers rare. Common. The wood is valuable for cabinet making, and an aromatic oil is extracted from the bark.*

II. BENZOIN Fabric.

Shrubs. Leaves deciduous, entire. Flowers in lateral, sessile clusters, appearing before the leaves, dicœcious or somewhat moncœcious. Involucre of 4 scales. Stamens 9 in the staminate

flowers; filaments slender. Pistillate flowers with 12–15 abortive stamens and a single globose ovary with a short style.*

1. B. æstivale Nees. Spice Bush. A shrub, 5–15 ft. high, with smooth bark and slender twigs. Leaves oblong-obovate, acute at the base, pale and downy beneath, becoming smooth when old; petioles short. Flowers about as long as the pedicels, yellow, very fragrant. Ovary about as long as the style. Fruit an obovoid, red drupe, about $\frac{1}{3}$ in. long, on a slender pedicel. Banks of streams and damp woods. Twigs and leaves quite aromatic.*

39. PAPAVERACEÆ. Poppy Family

Annual or perennial herbs, often with milky juice. Leaves sometimes all basal; stem leaves usually alternate without stipules. Flowers bisexual, regular or irregular. Sepals usually 2, shed as the flower opens. Petals 4–12, falling early. Stamens numerous or 6 (in 2 sets), 4, or 2. Carpels 2–16. Fruit a capsule.

I. ESCHSCHOLTZIA Cham.

Annual or perennial herbs. Leaves pale or bluish-green, usually cut into very narrow divisions. Sepals united into a pointed cap, which falls off in one piece as the flower opens. Petals 4, orange or yellow. Stamens many, with long anthers. Stigmas 2–6, spreading. Pods long and slender, grooved. Receptacle often surrounded by a rim on which the calyx rests.

1. E. californica Cham. Annual or perennial, with rather succulent leafy stems. Flowers large and showy, yellow or orange-yellow. Receptacle top-shaped, with a broad rim. Cultivated from California.

II. SANGUINARIA L.

Perennial. Rootstock thick, horizontal; joints and scars of previous growths persistent several years; juice orange-colored. Leaves on long petioles, kidney-shaped. Scape 1-flowered. Sepals 2, falling off as the flower opens. Petals 8–12. Ovary 1; stigmas 2. Capsule oblong, seeds crested.*

1. S. canadensis L. Bloodroot. Leaves and scape with a bloom; leaves palmately 5–9-lobed, lobes rounded or toothed; scapes naked, nearly as long as the petioles. Flowers white, 1 in. or more wide.

Petals oblong or obovate, quickly deciduous. Capsule 1-celled, 2-valved, the valves separating from the persistent placentæ at maturity. In rich, open woods.*

III. CHELIDONIUM L.

Erect, branched, perennial herbs, with yellow juice. Leaves much divided. Flowers yellow. Sepals 2, falling as the flower opens. Petals 4. Ovary 1-celled; style dilated at the top, with 2 joined stigmas. Capsule linear.

1. C. majus L. Celandine. Stem 1–2 ft. high, brittle, slightly hairy, leafy. Leaves once or twice pinnate. Flowers small. A rather common weed in yards and along fences. Naturalized from Europe.

IV. PAPAVER L.

Annual or perennial herbs with milky juice. Stem erect, smooth, or rough-hairy, branching above. Leaves more or less lobed or dissected. Flower buds nodding, flowers showy. Sepals commonly 2, falling off as the flower opens. Petals 4–6. Stamens many. Stigma disk-like; ovules many, borne on many inwardly projecting placentæ.*

1. P. somniferum L. Opium Poppy. Annual. Stem erect, branched above, smooth and with a bloom, 2–3 ft. high. Leaves oblong, irregularly lobed or cut, sessile, clasping. Flowers nearly white, with a purple center, large and showy, on long peduncles. Capsule globose, seeds minutely pitted. About old gardens and waste places. Cultivated in southern Asia, where the juice of the capsules is dried to make opium.*

2. P. Rhœas L. Corn Poppy. Annual. Stem erect, hairy, 1–3 ft. high. Lower leaves petioled, upper ones sessile, all pinnately cut, the lobes serrate. Corolla scarlet, often with a dark center, 2–4 in. in diameter. Capsule smooth, obovoid. Waste ground, sometimes in fields. Introduced from Europe and often cultivated.

3. P. dubium L. Smooth-Fruited Poppy. Annual. Stem slender, branching, 1–2 ft. tall. Leaves pinnatifid, the lower petioled, the upper sessile. Flowers large and showy, usually red; capsule long-obovoid, smooth. In cultivated ground. Both this and No. 1 are often cultivated in gardens and produce double flowers.*

4. P. orientale L. Oriental Poppy. A large, rough-hairy perennial. Leaves large, deep green, almost pinnate. Flower very large, deep red. Cultivated from the eastern Mediterranean region.

5. P. nudicaule L. ICELAND POPPY. A delicate but rough-hairy perennial plant. Leaves all basal, pale, pinnately cut. Flowers yellow-orange or white, borne singly on rather slender, hairy scapes. Cultivated from Europe.

V. ADLUMIA Raf.

A delicate climbing biennial. Leaves thrice-pinnate, cut-lobed. Sepals 2, very small. Petals 4, all united into a corolla which is slightly heart-shaped or 2-knobbed at the base, remaining as a spongy covering over the small, few-seeded pod.

1. A. fungosa Greene. MOUNTAIN FRINGE, ALLEGHENY VINE. Climbing several feet high by the leafstalks. Flowers pinkish-white. Rocky hillsides, often cultivated.

VI. DICENTRA Bernh. (BICUCULLA)

Smooth, delicate herbs, with watery juice. Leaves compound in threes and finely cut. Flowers racemed, nodding. Sepals 2, small and scale-like. Petals 4, slightly united to form a heart-shaped or 2-spurred corolla (Fig. 17), the inner pair spoon-

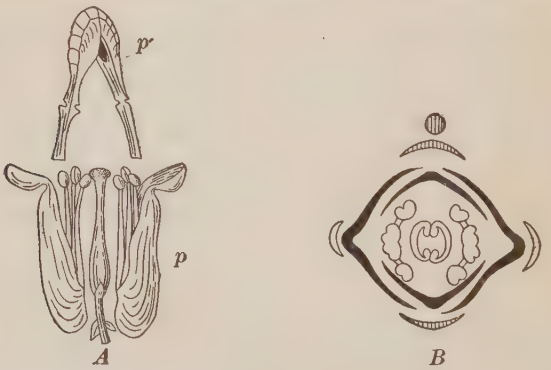


FIG. 17. Flower of *Dicentra*

A, view of flower partly dissected: *p*, the larger outer petals; *p'*, the spoon-shaped inner petals. *B*, floral diagram. (After Le Maout and Decaisne)

shaped, inclosing the stamens and pistil. Stamens 6; the filaments somewhat united into 2 sets, and the anthers in 2 sets close to the stigma. Stigma 2-crested. Pod 10–20-seeded.

1. D. Cucullaria Bernh. DUTCHMAN'S BREECHES, BREECHES FLOWER. A low, stemless perennial, with a delicate scape and a cluster of basal leaves with linear divisions, from a sort of bulb made of small, scaly grains. Flowers in a 4–10-flowered simple raceme, not fragrant. Spurs of the corolla longer than the pedicels; corolla mostly white with a yellowish tip. Rich woods, common.

2. D. canadensis Walp. SQUIRREL CORN, WILD HYACINTH. A low, stemless perennial, with scape and leaves much as in No. 1, and with small yellow tubers looking like grains of corn scattered along the underground shoots. Corolla only heart-shaped at the base, whitish or flesh-colored, very fragrant. Rich woods.

3. D. spectabilis Lem. BLEEDING HEART, EAR DROPS. Stems branching, recurved. Leaves large, twice compound in threes, the divisions rather broad, like those of the common peony. Racemes long, drooping, many-flowered. Flowers large, heart-shaped, bright pink. Cultivated from China.

VII. CORYDALIS Medic. (CAPNOIDES)

Leafy-stemmed biennial herbs (the American species). Leaves much divided, alternate or nearly opposite. Racemes terminal or opposite the leaves. Sepals 2, small. Petals 4; corolla with a single spur at the base, on the upper side. Capsule many-seeded.

1. C. sempervirens L. PALE CORYDALIS. Plant erect, covered with a bloom. Flowers pink-purple with yellow tips. Spur of the corolla very short and rounded. Rocky woods.

2. C. aurea Willd. GOLDEN CORYDALIS. A low, spreading plant, finally ascending. Corolla bright yellow, 1–2 in. long; the spur shorter than the pedicel, somewhat bent. Shaded, rocky banks.

40. CRUCIFERÆ. MUSTARD FAMILY

Herbs with pungent, watery juice, and alternate leaves without stipules. Sepals 4, often falling off early. Petals usually 4, arranged in the form of a cross. Stamens 6, the 2 outer ones shorter than the 4 inner ones. Fruit generally a pod, divided into 2 cells by a thin partition which stretches across from one to the other of the 2 placentæ. The flowers throughout the family are so much alike that the genera and species cannot usually be determined without examining the tolerably mature fruit.

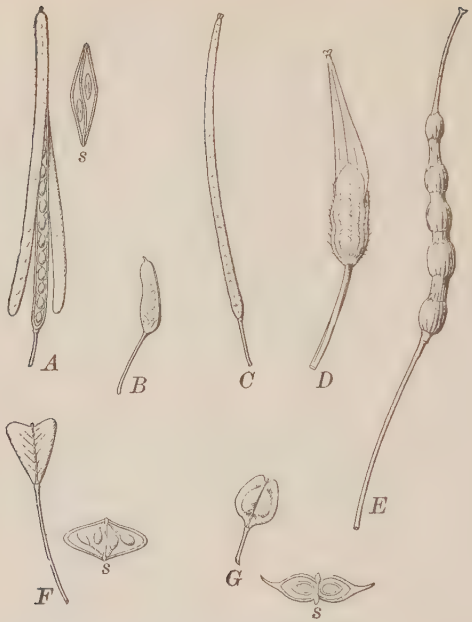


FIG. 18. Types of pods of *Cruciferæ*

A, flattened pod of *Arabis*, seeds in a single row in each cell: *s*, cross section of pod, showing flattening parallel to the partition. *B*, pod of *Radicula palustris*, seeds in several rows. *C*, nearly cylindrical pod of *Sisymbrium*. *D*, beaked pod of white mustard (*Sinapis alba*). *E*, dried necklace-shaped and beaked pod of radish (*Raphanus Raphanistrum*). *F*, flattened pod of shepherd's purse (*Capsella Bursa-pastoris*): *s*, cross section, showing flattening at right angles to the partition. *G*, flattened pod of *Lepidium campestre*; *s*, cross section, showing flattening at right angles to the partition. (The pods natural size, the sections somewhat magnified.) (After Cosson and De Saint-Pierre)

A

Pods short and flattened, contrary to the partition, splitting open when ripe.

Pod roundish. Lepidium, IV

Pod triangular, inversely heart-shaped. Capsella, V

B

Pods globular or cylindrical, splitting open when ripe.

(*a*) Pods globular. Flowers yellow. Lesquerella, III

(*b*) Pods cylindrical; seeds ellipsoid. Flowers very small, yellow. Sisymbrium, VIII

(*c*) Pods cylindrical; seeds globular. Flowers of moderate size, yellow. Brassica, VII

(*d*) Pods cylindrical; seeds in 2 rows; flowers white. Or pods ovoid or ellipsoid; flower yellowish. Aquatic plants, or growing in wet soil. Radicula, IX

(*e*) Pods cylindrical or angled; seeds in a single row, flattened. Flowers yellow. Barbarea, X

C

Pods elongated, often jointed, tapering toward the tip, never splitting open. Raphanus, VI

D

Pods flattened parallel to the partition, splitting open when ripe.

(*a*) Wild species; leafy-stemmed; growing in or near water. Pods linear. Cardamine, XII

(*b*) Wild species; stems naked below, bearing only 2 or 3 leaves. Pods lanceolate. Dentaria, XI

(*c*) Wild species; leafy-stemmed; growing on dry ground or rocks. Pods linear; seeds usually winged or margined. Arabis, XIII

(*d*) Cultivated species. Pods round or roundish. Lobularia, I

(*e*) Cultivated species; covered with a grayish down of star-shaped hairs. Pods cylindrical. Matthiola, II

I. LOBULARIA Desv. (KONIGA)

Perennial, though usually growing as an annual. Stems branching, diffuse; branches slender. Leaves small, entire, downy, with forked hairs. Flowers small, white, in numerous terminal racemes. Petals obovate, entire, twice as long as the sepals. Filaments enlarged below. Pod round, compressed; seeds 1 in each cell.*

1. L. maritima Desv. Sweet Alyssum. Stem weak, diffuse, ascending, minutely downy. Lower leaves narrowed into a petiole, the upper sessile. Racemes erect, many-flowered. Flowers fragrant, pedicels ascending. Pod often pointed. Common in cultivation and often run wild.*

II. MATTHIOLA R. Br.

Herbaceous or shrubby oriental plants, covered with a down composed of star-shaped hairs. Flowers in showy racemes of many colors, ranging from white to crimson. Stigmas large and spreading. Pods nearly cylindrical, except for a prominent midrib on each valve.

1. M. incana R. Br. Common Stock, Gillyflower. Biennial or perennial, with somewhat woody stems. Cultivated in greenhouses and gardens.

III. LESQUERELLA Wats.

Low herbs with stellate hairs. Leaves simple. Flowers in racemes, mostly yellow. Pod globular-inflated, with a translucent partition nerved from the apex to the middle. Seeds few, several or many, flattened, marginless or nearly so.

1. L. globosa Wats. Annual or biennial. Slender, somewhat branched, 6–20 in. high, covered with fine stellate hairs. Basal leaves 1–1½ in. long, oblong-obovate, obtuse. Stem leaves smaller, linear or oblong, sessile. Raceme finally elongated with thread-like diverging pedicels. Flowers light yellow. Style slender, much longer than the small globose pod. Rocky banks and open places S. and W.

2. L. argentea Pursh. Silvery Bladder Pod. Biennial or perennial, 6–18 in. high, densely stellate-hairy. Leaves linear to oblanceolate, blunt, entire, the lower ones 2–3 in. long. Flowers yellow. Pods downy, on recurved pedicels. Plains W.

IV. LEPIDIUM L.

Annual. Stem erect, or sometimes diffuse. Leaves entire, toothed, or pinnately divided. Flowers in a terminal raceme, small, white. Petals short, sometimes wanting. Stamens 2, 4, or 6. Pod rounded or obcordate, flattened contrary to the partitions.*

1. L. virginicum L. Peppergrass, Birds' Pepper, Tongue Grass. Stem erect, smooth, much branched, 1–2 ft. high. Lower leaves obovate in outline, pinnately cut with dentate lobes; upper leaves lanceolate, dentate, slightly downy. Flowers on slender pedicels; petals present, sometimes reduced in the later flowers. Stamens 2. Pod round. A weed growing in waste places.*

2. L. campestre R. Br. Field Cress. Annual or biennial. Stem erect, branching above, downy, 8–18 in. high. Basal leaves entire or

pinnately cut toward the base, obtuse; stem leaves oblong or lanceolate, entire or somewhat toothed, with an arrow-shaped clasping base. Flowers white or yellowish, on stout pedicels. Pods ovate, winged, slightly notched, tipped with a very small persistent style. Fields and waste ground, becoming a troublesome weed. Naturalized from Europe.

V. CAPSELLA Medic. (BURSA)

Annual. Stem erect, downy, with branched hairs. Racemes terminal, becoming elongated in fruit. Flowers small, white. Pod obcordate or triangular, flattened contrary to the partition, shorter than the spreading pedicels.*

1. C. Bursa-pastoris Medic. Shepherd's Purse. Root long and straight. Stem branching above, downy below, smooth above. Lower leaves forming a rosette at the base of the stem, irregularly lobed or pinnately cut; stem leaves lanceolate, clasping, toothed or entire. Sepals downy, about ½ as long as the petals. Pod triangular, notched, or cordate at the apex. Seeds several in each cell. A common weed.*

VI. RAPHANUS L.

Annual or biennial herbs. Basal leaves lyrate. Flowers in long racemes, white or yellow, purple-veined. Sepals erect. Pods rather long, slender-beaked, not splitting open but sometimes breaking across into 1-seeded joints.

1. R. Raphanistrum L. Wild Radish, Jointed Charlock. A stout, hairy annual, 1–2 ft. high. Leaves cut into remote segments, which are coarsely toothed or serrate; terminal segment largest. Flowers yellow, turning whitish or purplish. Pods necklace-shaped, and with a long beak. A common weed eastward. Naturalized from Europe.

2. R. sativus L. Common Radish. Similar to No. 1, but with pink or white flowers. Root fleshy, conical or turnip-shaped. Pod fleshy, 2–3-seeded, the beak often longer than the seed-bearing portion. Cultivated from Asia and occasionally self-sown in cultivated ground.

VII. BRASSICA L.

Branching herbs. Leaves often pinnately cut. Flowers in racemes, rather large, yellow. Sepals spreading. Pods nearly cylindrical, sometimes tipped with a beak which does not open. Seeds globular.

1. B. alba Boiss. WHITE MUSTARD. Stem 2–5 ft. high, with reflexed hairs. Upper leaves pinnately cut. Pods borne on spreading pedicels, bristly, with a sword-shaped, 1-seeded beak occupying more than half their length. Seeds pale. Cultivated from Europe and introduced to some extent.

2. B. arvensis Ktze. CHARLOCK. Stem 1–2 ft. high; it and the leaves rough-hairy. Upper leaves rhombic, barely toothed. Flowers ½–¾ in. across, somewhat corymbed, bright yellow. Pods knotty, spreading, at least ⅓ of each consisting of a 2-edged, 1-seeded beak. A showy, troublesome weed in grain fields. Naturalized from Europe.

3. B. juncea Cosson. Similar to the preceding, but nearly or quite smooth. Pedicels slender. Beak slender, conical, not containing a seed. Naturalized from Asia and becoming very abundant eastward.

4. B. nigra Koch. BLACK MUSTARD. Stem 3–6 ft. high, somewhat hairy. Lower leaves lyrate, with the terminal lobe much the longest; stem-leaves linear-lanceolate, entire or toothed, smooth. Pods awl-shaped, 4-angled, smooth, lying against the stem; seeds brownish, more biting than in No. 1. Cultivated from Europe and introduced.

VIII. SISYMBRIUM L.

Annual or biennial herbs. Radical leaves spreading; stem leaves alternate, often eared at the base. Flowers in loose racemes, usually yellow, often bracted. Pods generally narrowly linear, cylindrical, or 4–6-angled; seeds many, ellipsoid, not margined.

1. S. officinale Scop., var. **leiocarpum.** HEDGE MUSTARD. Stems branching, stiff. Leaves runcinate-toothed or lobed. Flowers very small, pale yellow. Pods somewhat 6-sided, awl-shaped, smooth, closely pressed against the stem. An unsightly weed in waste ground. Naturalized from Europe.

2. S. canescens Nutt. TANSY MUSTARD. Stem 1–2 ft. high. Leaves twice pinnately cut, usually covered with grayish down. Flowers very small, yellowish. Pods oblong, club-shaped, 4-angled, borne on pedicels projecting almost horizontally from the stem, in long racemes. Common westward.

IX. RADICULA Hill. (RORIPA)

Annual or biennial, mostly aquatic plants. Stems erect or diffuse, often widely branching. Leaves simple, pinnately lobed. Flowers small, white or yellow. Sepals spreading.

Stamens 1–6. Pod short and broad or nearly linear; seeds numerous, in 2 rows in each cell.*

1. R. Nasturtium-aquaticum B. & R. WATERCRESS. Aquatic herbs. Stems smooth, diffuse, rooting at the joints. Leaves with 3–9 rounded, pinnate lobes, the terminal lobe much the largest. Racemes elongating in fruit. Petals white, twice the length of the sepals. Pods linear, $\frac{1}{2}$–$\frac{3}{4}$ in. long, on slender, spreading pedicels. In ditches and slow streams. Often used for salad.*

2. R. sinuata Greene. SPREADING YELLOW CRESS. Perennial. Stems low and spreading. Leaves oblong or lanceolate, pinnately cleft, the lobes obtuse. Flowers yellow, about $\frac{1}{6}$ in. in diameter. Pods linear oblong, $\frac{1}{3}$–$\frac{1}{2}$ in. long. River bottoms and moist ground W.

3. R. palustris Mœnch. YELLOW WATERCRESS. Annual or biennial. Stem erect, branched, slightly downy. Leaves irregularly lyrate, the lower petioled, the upper sessile. Flowers small; petals yellow. Pods linear, spreading, longer than the pedicels. In wet places.*

4. R. Armoracia Robinson. HORSE-RADISH. A coarse herb, with large leaves, from stout, long, cylindrical rootstocks filled with a very sharp, biting juice. Basal leaves long-petioled, linear-oblong, obtuse, regularly scalloped; stem-leaves sessile. Racemes in panicles. Pods obovoid, on long, slender pedicels; seeds seldom or never ripening. Probably from Europe; cultivated and often introduced in damp ground.

X. BARBAREA R. Br.

Mostly biennials, somewhat resembling *Radicula*. Flowers yellow. Pod elongated, linear, cylindrical, or somewhat 4-sided. Style short. Seeds in 1 row in each cell, not margined.

1. B. vulgaris R. Br. WINTER CRESS, YELLOW ROCKET. Smooth, with tufted stems 1–2 ft. high. Lower leaves petioled, pinnately cut, with 1–4 pairs of lateral divisions and a rounded, much longer terminal one; upper leaves nearly or quite sessile. Flowers $\frac{3}{8}$ in. in diameter or less. Pods erect or spreading. Fields and waste ground. Introduced from Europe into the eastern and central states.

XI. DENTARIA L.

Stems naked below, 2–3-leaved above, from a thickish, more or less knotted or interrupted rootstock. Flowers rather large, in early spring. Pod lance-linear, flattish; seeds in 1 row, wingless; seedstalks broad and flat.

1. D. diphylla L. Two-Leaved Toothwort, Pepper Root, Crinkle Root. Rootstock long, often branched, toothed, eatable, with a flavor like that of cress or radish. Stem leaves 2, close together, each composed of 3 ovate-diamond-shaped and toothed or crenate leaflets; the basal leaf like the stem leaves. Flowers white. Damp woods.

2. D. laciniata Muhl. Crow's-Foot. Rootstock short, necklace-like. Stem leaves 3-parted; basal leaf often absent. Flowers white or rose color. Woods.

XII. CARDAMINE L.

Annual or perennial. Rootstock often scaly or bulb-bearing. Stem erect or ascending, usually smooth. Leaves more or less divided. Flowers in terminal racemes, white or purple. Petals rather large. Stamens 6. Fruit a linear, flattened pod; seeds several, in a single row in each cell.*

1. C. rhomboidea DC. Bulbous Cress. Perennial. Root tuberous. Stem simple, erect, smooth, without runners, 9–18 in. tall. Lower leaves long-petioled, ovate, orbicular, or heart-shaped, often angled or toothed; the upper short-petioled or sessile, lanceolate or oblong, toothed or entire. Pedicels $\frac{1}{2}$–1 in. long. Petals white, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Pod erect, linear-lanceolate, tipped by the persistent style; seeds round-oval. Cool, wet places.*

2. C. pennsylvanica Muhl. Bitter Cress. Annual. Stem slender, erect, simple, or with a few slender branches, 6–15 in. tall. Leaves mostly in a cluster at the base of the stem, pinnately divided, the terminal lobe roundish, the lateral lobes narrower, somewhat hairy above; stem leaves nearly linear. Flowers small. Petals white, longer than the sepals. Stamens 4. Pods linear, erect on erect pedicels, about 1 in. long; seeds oval. In wet places.*

XIII. ARABIS L.

Annual or perennial herbs, smooth, or with forked or star-shaped hairs. Basal leaves spatulate; stem leaves sessile. Flowers usually white. Petals entire, usually with claws. Pods linear, flattened; seeds often margined or winged.

1. A. hirsuta Scop. A rough-hairy, erect, leafy-stemmed biennial, 1–2 ft. high. Leaves simple; stem leaves oblong or lanceolate, entire or toothed, somewhat clasping, often with an arrow-shaped base. Flowers small, greenish-white, the petals somewhat longer than the sepals. Pods and pedicels upright. Style almost wanting. Seeds roundish, somewhat wing-margined. Rocks, N.

2. A. lævigata Poir. A smooth, leafy-stemmed biennial, 1–2 ft. high, covered with a bloom. Stem leaves lance-linear, clasping. Flowers small and whitish, the petals hardly longer than the sepals. Pods 2–3 in. long, flattened, spreading, and recurved; seeds broadly winged. Rocks.

3. A. canadensis L. Sickle Pod. An upright, leafy-stemmed biennial, 2–3 ft. high, simple or slightly branching above, sometimes slightly hairy at the base. Stem leaves sessile, oblong-lanceolate, pointed at both ends, downy; the lower ones toothed. Flowers small, whitish, the petals twice as long as the sepals. Pods scythe-shaped, much flattened, hanging from hairy pedicels; seeds broadly winged. Rocky hillsides.

41. CAPPARIDACEÆ. Caper Family

Herbs (when growing in cool temperate regions), with bitter or nauseous juice. Leaves alternate, usually palmately compound. Flowers often not actinomorphic, usually bisexual. Sepals 4–8. Petals 4 or wanting. Stamens 6 or more. Ovary and pod 1-celled, with 2 rows of ovules; seeds kidney-shaped.

I. POLANISIA Raf.

Ill-smelling annual plants covered with glandular or clammy hairs. Sepals distinct, spreading. Petals with claws, notched at the tip. Stamens 8–32, of various lengths. Receptacle not lengthened. Pod linear or oblong, rather large, many-seeded.

1. P. graveolens Raf. A very strong-scented, leafy, branching herb, 6–15 in. high. Leaves with 3 oblong leaflets. Flowers small, pinkish and yellowish-white, in the axils of leafy bracts, in terminal racemes. Stamens 8–12, not much longer than the petals. Pod about 2 in. long, slightly stalked. Gravelly banks.

II. CLEOME L.

Mostly annual herbs. Stems branched. Leaves petioled, simple, or with 3–7 entire or serrate leaflets. Flowers in bracted racemes. Sepals 4, often persistent. Petals 4, often long-clawed, nearly equal, entire. Stamens 6, filaments thread-like, usually projecting much, but sometimes 1–3 much shorter than the others, inserted on the short receptacle. Ovary on a

short stalk with a small gland at its base. Fruit a slender capsule on an elongated stalk.*

1. C. serrulata Pursh. Rocky Mountain Bee Plant, Stinking Clover. A smooth plant 2 ft. or more high. Leaves with 3 leaflets. Flowers pink, showy, in leafy-bracted racemes. Pod oblong to linear, 1–2 in. long. Cultivated as an ornamental plant and also for bees. Common in a wild condition W.

42. RESEDACEÆ. Mignonette Family

Annual or perennial herbs, rarely shrubs. Leaves alternate, simple or pinnately cut. Flowers racemed or spiked, bracted. Calyx 4–7-parted, often not actinomorphic. Petals 4–7, hypogynous, often unequal and cleft or notched. Stamens usually many, borne on a large one-sided hypogynous disk. Ovary of 2–6 carpels, which are more or less united into a single 1-celled, many-seeded, several-lobed or -horned pistil, which opens at the top before the seeds ripen.

RESEDA L.

Annual. Stems diffuse, widely branched. Leaves sessile, entire or lobed, smooth. Flowers in close racemes or spikes. Petals 4–7, toothed or cleft. Stamens 8–30, inserted at one side of the flower. Capsule 3–6-lobed.*

1. R. odorata L. Mignonette. Stem widely diffuse, 6–12 in. high, smooth. Leaves wedge-shaped, entire or 3-lobed. Flowers small, greenish-yellow, very fragrant. Petals deeply 7–13-cleft. Often cultivated. From Egypt.*

43. SARRACENIACEÆ. Pitcher Plant Family

Perennial, apparently stemless, marsh herbs. Leaves tubular or trumpet-shaped. Flowers single, nodding, on a naked or bracted scape. Sepals 4–5, colored, persistent. Petals 5, deciduous, or sometimes wanting. Stamens numerous. Pistil compound, 5-celled, many-ovuled; style terminal, nearly as broad as the flower, shield-shaped.*

SARRACENIA L.

Rootstock short, horizontal; scape naked. Leaves trumpet-shaped, with a wing extending nearly to the base and a broad blade at the apex; tube hairy within, with downward-pointing, stiff hairs. Calyx 3-bracted. Petals obovate, drooping or incurved. Style umbrella-shaped, 5-angled; stigmas at the hooked angles of the style on the under surface. Capsule globose, rough. [The tubular leaves usually contain more or less water and dead insects, the latter having been attracted by a honey-like secretion near the opening.]

1. S. purpurea L. Sidesaddle Flower. Leaves ascending, curved, broadly winged, purple-veined, 4–8 in. long; blade erect, round-cordate, hairy on the inner side. Scapes 12–18 in. tall; flower deep purple, about 2 in. broad; style yellowish. Mossy swamps.*

44. SAXIFRAGACEÆ. Saxifrage Family

Herbs or shrubs. Leaves alternate or opposite, generally without stipules. Sepals 4 or 5, more or less joined with each other and not usually hypogynous. Petals as many as the sepals and alternate with them. Stamens as many as the petals and alternate with them, or 2–10 times as many. Ovary usually of two carpels, united only at the base or more or less throughout. Fruit generally a 1–2-celled capsule, sometimes a berry; seeds many, with endosperm.

I. SAXIFRAGA L.

Herbs with simple or palmately cut leaves and generally cymose or panicled flowers. Sepals 5, more or less united. Petals 5, entire, inserted on the calyx tube. Stamens 10. Capsule consisting of 2 (sometimes more) ovaries, united at the base, separate and diverging above.

1. S. pennsylvanica L. Swamp Saxifrage. Perennial. Leaves 4–8 in. long, oblong-lanceolate and tapering to the base, slightly toothed. Scape 1–2 ft. high, bearing an oblong cluster of small greenish flowers, at length diffusely panicled. Petals greenish-yellow

(rarely crimson), linear-lanceolate, hardly longer than the calyx lobes. Boggy ground.

2. **S. virginiensis** Michx. Early Saxifrage, Mayflower. Perennial. Apparently stemless, with a cluster of spatulate, obovate, or wedge-shaped basal leaves, and a scape 3–9 in. high, which bears a dense cluster of small white flowers, becoming at length a panicled cyme. Petals white, oblong, much longer than the calyx. Rocks and dry hillsides N.

II. TIARELLA L.

Perennial. Flowers white, in racemes. Calyx white, 5-parted, nearly hypogynous. Corolla of 5 very narrow petals, with slender claws, alternating with the calyx lobes. Stamens 10, springing from the calyx tube and extending outside the flower. Styles 2, long and slender; ovary 1-celled, 2-beaked. In fruit one of the carpels grows to be much larger than the other, thus making up the main bulk of the thin, dry pod, which has a few seeds attached near the bottom.

1. **T. cordifolia** L. False Miterwort. Stem 5–12 in. high, usually leafless, sometimes with 1 or 2 leaves. Rootstock bearing runners in summer. Leaves heart-shaped, sharply lobed, the lobes with acute or mucronate teeth, somewhat hairy above, downy beneath. Raceme short and simple. Rocky woods, especially N.

III. HEUCHERA L.

Perennials, with a tall scape and roundish, heart-shaped basal leaves. Flowers rather small, greenish or purplish, in a long panicle. Calyx 5-cleft, the tube somewhat perigynous. Petals 5, small, spatulate, inserted with the 5 stamens on the margin of the calyx tube. Capsule 1-celled, 2-beaked, splitting open between the beaks.

1. **H. americana** L. Common Alum Root. Scapes 2–4 ft. high, rather slender, often several from the same root, hairy and glandular. Basal leaves large and long-petioled, abundant, somewhat 7-lobed. Flowers whitish with a tinge of purple, in a loose panicle. Stamens projecting considerably outside the flower, their anthers of a bright terra cotta color. The root is very astringent and is somewhat used as a home remedy. Shaded banks, fence rows, and thickets; common W.

IV. MITELLA L.

Delicate perennial herbs. Flowers small, pretty, in a simple raceme or spike. Calyx 5-cleft, slightly perigynous. Petals 5, cut-fringed, inserted on the throat of the calyx tube. Stamens 5 or 10, not projecting from the calyx tube. Styles 2, very short. Ovary and pod 2-beaked, globular, 1-celled.

1. M. diphylla L. Two-Leaved Bishop's Cap, Fringe Cup, Fairy Cup. Stemless, with long-petioled, roundish-cordate root leaves, and a scape about 1 ft. high, bearing 2 opposite, nearly sessile leaves. Flowers many, racemed, white. Woods.

V. PHILADELPHUS L.

Shrubs. Leaves simple, opposite, 3–5-ribbed, petioled, without stipules. Flowers solitary or in cymes, large, white. Calyx tube top-shaped, the epigynous limb 4–5-parted, persistent. Petals 4–5, rounded or obovate. Stamens 20–40, shorter than the petals. Ovary 3–5-celled, many-seeded; styles 3–5, more or less united.*

1. P. grandiflorus Willd. Large-Flowered Syringa. Shrub, 6–10 ft. high; branches downy. Leaves ovate or ovate-oblong, taper-pointed, sharply serrate, downy, 3-ribbed. Flowers solitary or 2–3 together, white, 1½–2 in. broad, not fragrant. Calyx lobes ovate, taper-pointed, about twice as long as the tube. On low ground S., and cultivated.*

2. P. coronarius L. Garden Syringa. Shrub, 8–10 ft. high. Leaves oval or ovate, obtuse at the base, acute at the apex, remotely toothed, smooth above, downy beneath. Flowers in terminal racemes, creamy white, 1–1½ in. wide, very fragrant. Calyx lobes ovate, acute, longer than the tube. Common in cultivation. From southern Europe.*

VI. DEUTZIA Thunb.

Shrubs with simple, opposite leaves, without stipules. Flowers all bisexual and alike, racemed or panicled, showy. Calyx lobes 5. Petals 5. Stamens 10, 5 long and 5 short; filaments flat and 3-pronged, the middle prong bearing an anther. Styles 3–5, slender. Pod 3–5-celled.

1. D. gracilis Sieb. & Zucc. About 2 ft. high, loosely spreading. Leaves ovate-lanceolate, sharply serrate, smooth. Flowers white, very numerous. Cultivated from Japan, often in greenhouses.

VII. RIBES L.

Shrubs. Leaves palmately veined and lobed, sometimes with stipules. Calyx tube egg-shaped, its 5 epigynous lobes usually colored like the petals. Petals 5, small, generally inserted on the throat of the calyx tube. Stamens 5, inserted with the petals. Styles 2; ovary 1-celled, with 2 placentæ on its walls, becoming in fruit a pulpy (usually eatable) berry.

1. R. Cynosbati L. Prickly Wild Gooseberry. Spines in pairs. Leaves long-petioled, downy, heart-shaped, cut-dentate. The single style and the stamens not projecting from the calyx tube. Berries generally prickly, brownish-purple, pleasant-flavored.

2. R. gracile Michx. Slender Gooseberry. Spines slender, solitary, or in pairs or threes. Leaves with slender petioles, somewhat downy when young, round, the base truncate or obtuse, 3–5-lobed, the divisions obtuse and toothed. Flowers often in threes, white or greenish, drooping. Calyx lobes longer than the tube; stamens decidedly projecting from the tube. Berries smooth, reddish-purple. Dry or rocky soil W.

3. R. rotundifolium Michx. Smooth Wild Gooseberry. Spines few and short, prickles few or absent. Leaves roundish, lobed, with the lobes crenate-dentate, often downy. Peduncles slender; flowers inconspicuous. Calyx lobes reflexed. Styles and stamens projecting decidedly from the calyx tube. Berries smooth.

4. R. oxyacanthoides L. Northern Gooseberry. Spines usually solitary, often numerous. Leaves petioled, their lower surfaces and petioles commonly downy. Flowers 1–3 together, on short pedicels, greenish-purple or white. Berry $\frac{1}{3}$–$\frac{1}{2}$ in. in diameter, smooth, reddish-purple. Low grounds and damp woods N.

5. R. americanum Mill. Wild Black Currant. Branches thornless, erect. Leaves resinous-dotted, somewhat heart-shaped, 3–5-lobed, toothed. Flowers large, whitish. Calyx tubular-bell-shaped, smooth. Fruit round-ovoid, black, smooth. In woods.

6. R. vulgare Lam. Red Currant. Stems more or less reclining. Leaves somewhat heart-shaped, obtusely 3–5-lobed. Racemes drooping. Limb of the calyx wheel-shaped. Berries acid, eatable, red or light amber-colored. Cultivated from Europe; also somewhat naturalized.

7. R. odoratum Wendland. Golden Currant, Flowering C., Missouri C., Clove Currant. A much taller shrub than the common red currant. Leaves 3-lobed, toothed. Racemes short and loose. Tube of the yellow calyx much longer than its limb. Flowers very fragrant. Fruit brownish-black, barely eatable.

45. PLATANACEÆ. Sycamore Family

Trees, with simple, alternate, petioled leaves, with stipules; the bases of the petioles covering the buds. Flowers monœcious, in axillary, long-peduncled, globose heads. Calyx and corolla very inconspicuous, each consisting of 3–8 minute scales, or wanting. Stamens as many as the sepals and opposite them. Pistils several, inversely conical, hairy at the base; styles long. Capsules 1-seeded.*

PLATANUS L.

Characters of the family.

1. P. occidentalis L. Sycamore, Buttonwood. A large tree, bark light-colored, smooth, peeling off in large, thin plates. Leaves large, round-heart-shaped, angularly lobed and toothed, densely white-woolly when young, becoming smooth with age; stipules large, toothed. Fruit in a globular, drooping head, which remains on the tree through the winter, dropping the seeds very slowly. Common on river banks and in swampy woods.*

46. ROSACEÆ. Rose Family

Herbs, shrubs, or trees. Leaves alternate or rarely opposite, simple or compound, with stipules. Calyx 5-lobed. Petals 5, rarely wanting, inserted with the stamens on the edge of a disk that lines the calyx tube. Stamens many, rarely 1 or few. Carpels 1 or more, distinct or united, superior or inferior. Fruit a pome, a drupe or group of drupes, or 1–several akenes or follicles, rarely a berry or capsule. The relation of the parts of the flower to each other and to the receptacle is shown in Fig. 19.

A

Ripe carpels not inclosed within the calyx tube.

1. Fruit dry.
   (*a*) Carpels 1–5, inflated. Physocarpus, I
   (*b*) Pods 5–8, not inflated, 2–several-seeded. Spiræa, II

(*c*) Carpels 5–15 (usually 10), 1-seeded. Filipendula, X

(*d*) Akenes 2–6, styles not lengthening after flowering. Waldsteinia, VIII

(*e*) Akenes many, on a dry receptacle. Styles not lengthening. Potentilla, IX

(*f*) Akenes many, on a dry receptacle. Styles lengthening after flowering, forming tails to the akenes. Geum., XI

2. Fruit fleshy.

(*a*) Akenes several–many, becoming little drupes. Rubus, XII

(*b*) Akenes many, dry on ripening, on a fleshy, eatable receptacle. Fragaria, VII

(*c*) Pistil solitary, becoming a drupe Prunus, XIV

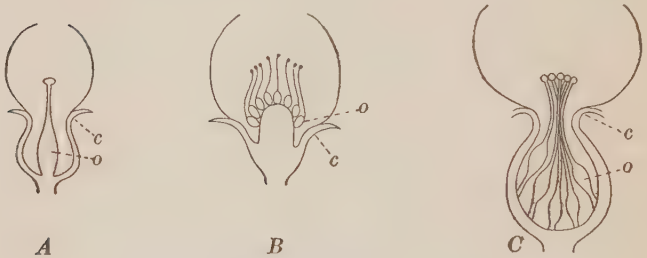


FIG. 19. Pistils in the Rose Family

A, *Prunus*-type; *B*, *Potentilla*-type; *C*, *Rosa*-type. *c*, calyx; *o*, ovary

B

Ripe carpels inclosed within the calyx tube.

1. Fruit a pome.

(*a*) Carpels more than 2-seeded; seeds covered with a mucilaginous pulp. Fruit 5-celled. Cydonia, III

(*b*) Carpels 2-seeded (except in some cultivated varieties); seeds without pulp. Fruit 5-celled. Pyrus, IV

(*c*) Carpels 2-seeded; fruit 10-celled. Amelanchier, V

2. Fruit not evidently a pome, or not at all so.
   (*a*) Trees or shrubs. Fruit with a stone usually of 2–5 bony 1-seeded carpels united. Crataegus, VI
   (*b*) Shrubs. Fruit with many akenes borne on the interior of a fleshy calyx tube. Rosa, XIII

I. PHYSOCARPUS Maxim. (OPULASTER)

Shrubs. Leaves simple, palmately veined and lobed, petioled. Flowers white, in terminal corymbs. Calyx spreading, 5-lobed. Petals 5. Stamens numerous. Pistils 1–5, short-stalked; stigma terminal; ovaries becoming inflated at maturity, 2–4-seeded, splitting open.*

1. P. opulifolius Maxim. Nine-Bark. A spreading shrub, 3–6 ft. high, the old bark separating into thin strips. Leaves petioled, broadly ovate or rounded, often heart-shaped, 3-lobed, the lobes doubly crenate-serrate; stipules deciduous. Corymbs terminal, peduncled, nearly globose, downy, many-flowered. Follicles 3–5, much longer than the calyx, smooth and shining, obliquely tipped by the persistent style. Banks of streams.*

II. SPIRÆA L.

Shrubs with simple leaves. Flowers perfect, in terminal or axillary racemes or panicles. Calyx 5-cleft, persistent. Petals 5. Stamens numerous. Pistils usually 5, free from the calyx and alternate with its lobes. Follicles not inflated, 2–several-seeded.*

1. S. salicifolia L. Willow-Leaved Spiræa. Shrubs 2–5 ft. high, branches smooth. Leaves lanceolate to oblong-ovate, smooth or nearly so, sharply serrate, base usually wedge-shaped, pale beneath; stipules deciduous. Flowers white or pink, panicle dense-flowered; follicles smooth. On low ground.*

2. S. cantoniensis Lour. Bridal Wreath. Shrubs 2–4 ft. tall; branches long, slender, and spreading. Leaves lanceolate, serrate, sometimes 3-lobed or pinnatifid, with a bloom beneath. Flowers white or pinkish, in axillary racemes or corymbs, often forming long wreaths. Follicles smooth. Cultivated from Europe.

3. S. tomentosa L. Hardhack. Erect shrubs. Stems densely downy, usually simple. Leaves simple, ovate or oblong, serrate, densely rusty-downy below, smooth and dark green above. Flowers

small, pink or purple, in a close panicle. Follicles 5, densely downy, several-seeded. On low ground S., and along fence rows and in pastures N., where it is a troublesome weed.*

III. CYDONIA L.

Trees or shrubs. Leaves simple, toothed or lobed, stipules deciduous. Flowers usually solitary, white or pink. Calyx tube urn-shaped, 5-lobed, its epigynous lobes acute, spreading, persistent. Petals 5. Stamens numerous, inserted with the petals on the calyx tube. Styles 2–5, mostly 5, united at the base; ovary 5-celled, seeds many in each cell. Fruit a pome, globose, usually depressed or hollowed at the extremities; flesh without hard grains.*

1. **C. vulgaris** Pers. QUINCE. Shrub 6–12 ft. high. Leaves oblong-ovate, acute at the apex, obtuse at the base, entire, downy below. Flowers large, white or pink. Fruit ovoid, downy. Cultivated.*

2. **C. japonica** Pers. JAPAN QUINCE. A widely branching shrub, 3–6 ft. high; branches with numerous straight spines. Leaves ovate-lanceolate, acute at each end, smooth and shining, serrulate; stipules conspicuous, kidney-shaped. Flowers in nearly sessile axillary clusters, bright scarlet. Fruit globose. Common in cultivation.*

IV. PYRUS L.

Trees. Leaves simple, stipules small, deciduous. Flowers in cymes, large, white or pink. Calyx urn-shaped, 5-cleft, its epigynous lobes acute. Petals rounded, short-clawed. Stamens numerous, borne with the petals on the calyx tube. Styles 5, distinct or slightly united at the base. Fruit a pome, with about 2 seeds in each carpel.*

B. Fl. species 2–5 (*Malus*); species 6 (*Aronia*); species 7, 8 (*Sorbus*).

1. **P. communis** L. PEAR. A tree, often very large; head usually pyramidal, branches often thorny. Leaves thick and leathery, ovate or oval, acute, finely serrate or entire, downy when young, becoming smooth with age; petioles slender. Cymes few–several-flowered, terminal, and at the ends of "fruit spurs" grown the previous season. Flowers white. Styles not united. Fruit obovoid, with hard gritty grains near the core. A European and Asiatic tree common in cultivation.*

2. P. angustifolia Ait. NARROW-LEAVED CRAB APPLE. A small tree, with smooth, light gray bark. Leaves lanceolate or oblong, serrate, downy when young, acute at the base, short-petioled. Corymbs few-flowered. Flowers pink, fragrant, about 1 in. broad. Styles smooth, distinct. Fruit nearly globose, about ¾ in. in diameter, very sour. In open woods, Pennsylvania, West, and South.*

3. P. coronaria L. AMERICAN CRAB APPLE. A small tree, with smooth bark. Leaves triangular or oval-lanceolate, acutish or rounded or a little heart-shaped at the base, cut-serrate and often somewhat 3-lobed, slender-petioled, soon smooth. Flowers large, few in a cluster, pale rose color, very sweet-scented. Fruit bright green, turning yellowish, sometimes 1½ in. in diameter, flattened at right angles to the pedicels, very fragrant. Glades, western New York, West, and South.

4. P. ioensis Bailey. WESTERN CRAB APPLE. A small tree, much like *P. coronaria* but with the leaves white-downy beneath, ovate-lanceolate and narrowed at the base. Fruit dull green with light dots, about 1 in. in diameter. Thickets W.

5. P. Malus L. APPLE. A tree with a rounded top and dark-colored bark. Leaves oval or ovate, obtuse or pointed, dentate or nearly entire, rounded at the base, smooth above, downy beneath. Cymes few–many-flowered. Flowers large, white or pink. Calyx downy. Fruit depressed-globose to ovoid, hollowed at the base and usually at the apex. Cultivated from Europe and often running wild in old pastures, etc., E.*

6. P. arbutifolia L. f. CHOKEBERRY, CHOKE PEAR, DOGBERRY. A shrub, 5–8 ft. high. Leaves oblong or oblanceolate, finely serrate, downy beneath, short-petioled. Flowers in a downy compound cyme, small, white or reddish. Fruit pear-shaped or nearly globular, not larger than a currant, very dark purple, dry and puckery. There is also a smooth-leaved variety with black fruit. Swamps and damp thickets, especially N.E.

7. P. americana DC. AMERICAN MOUNTAIN ASH. A tall shrub or small tree. Leaves odd-pinnate. Leaflets oblong-lanceolate, taper-pointed, sharply serrate, smooth, bright green. Flowers small, white, in large flat, compound cymes. Fruit bright scarlet, not larger than currants. Common N. and often cultivated.

8. P. Aucuparia Ehrh. EUROPEAN MOUNTAIN ASH or ROWAN TREE. Larger than No. 7. Leaflets paler, downy beneath. Fruit larger, about ½ in. in diameter. Cultivated from Europe.

V. AMELANCHIER Medic.

Shrubs or small trees, with smooth gray bark. Leaves simple, sharply serrate, petioled. Flowers white, in racemes.

Calyx tube 5-cleft, its lobes epigynous. Petals oblong. Styles 5, united below; ovary 5-celled, 2 ovules in each cell, often only 1 maturing. Fruit small, berry-like.*

1. A. canadensis Medic. Service Berry, Juneberry, Shad Bush, Sugar Plum, Sugar Pear, Wild Pear. A small tree, branches downy when young, soon becoming smooth. Leaves ovate to elliptical, finely and sharply serrate, acute at the apex, usually obtuse or cordate at the base. Racemes slender, many-flowered, appearing before or with the leaves. Flowers showy. Petals 4 or 5 times the length of the smooth calyx lobes. Fruit globose, dark red, edible. In rich woods. Extremely variable in height and in shape of leaves.*

2. A. spicata K. Koch. Round-Leaved Juneberry. Much like *A. canadensis*, but with the leaves broadly oval, ovate, or almost orbicular, and usually rounded at both ends. Woods and thickets, especially N.

VI. CRATÆGUS L.

Shrubs or small trees, mostly with numerous strong spines, wood very hard. Leaves serrate, lobed or deeply incised, petioled. Flowers white or pink, in terminal corymbs or sometimes solitary. Calyx tube urn-shaped, 5-cleft, the limb persistent. Petals round. Stamens few or many. Styles 1–5, distinct; ovules 1 in each cell. Fruit a small pome with bony carpels.* [The species are hard to distinguish and are not very perfectly defined. Probably more than 60 species occur within the limits of this flora.]

VII. FRAGARIA L.

Perennial scape-bearing herbs, with runners. Leaves with 3 leaflets; stipules united to the petiole. Flowers (of American species) white. Calyx hypogynous, 5-parted, 5-bracted, persistent. Petals 5. Stamens many. Carpels many, on a convex receptacle. Akenes of the ripe strawberry many, very small, more or less imbedded in the large, sweet, pulpy receptacle.

1. F. virginiana Duchesne. Wild Strawberry. Leaflets thick, oval to obovate, coarsely serrate, somewhat hairy. Scape usually shorter than the petioles, few-flowered. Fruit ovoid, akenes imbedded in deep pits. Common.*

2. F. vesca L. European Strawberry. Leaflets ovate or broadly oval, dentate above, wedge-shaped below, slightly hairy. Scape usually longer than the petioles. Fruit globular or oval, akenes adherent to the nearly even surface of the receptacle. Common in cultivation. Many of the cultivated varieties of strawberry are hybrids between the two described above. The following variety is by some regarded as distinct.*

Var. **americana** Porter. American Wood Strawberry. Slender, smooth or silky-downy. Leaflets very thin, sharply cut-toothed, downy beneath with close-lying silvery hairs, the down of the scapes, the pedicels, and sometimes of the leafstalks also, usually close-lying. Calyx lobes reflexed in fruit. Rocky woods.

VIII. WALDSTEINIA Willd.

Stemless perennial herbs. Leaves 3–5-lobed or -divided. Flowers several, rather small, yellow, on a bracted scape. Calyx tube top-shaped; the limb spreading, with sometimes little bracts alternating with the lobes. Petals 5. Stamens many. Style 2–6. Akenes few, on a dry receptacle.

1. W. fragarioides Tratt. Barren Strawberry. A low herb with much the appearance of a strawberry plant. Leaflets 3, broadly wedge-shaped, crenate-dentate. Scapes many-flowered; the flowers rather pretty. Wooded hillsides.

IX. POTENTILLA L.

Perennial herbs, rarely shrubs. Leaves compound; stipules united to the petiole. Flowers white or yellow, rarely red; solitary or in cymes. Calyx hypogynous, 5-cleft, with 5 little bracts alternating with its lobes. Petals 5. Stamens many. Carpels usually many, on a dry convex or concave receptacle; styles falling off from the akenes as they mature.

B. Fl. species 5 (*Argentina*).

1. P. arguta Pursh. Upright Cinquefoil. An erect, stout, hairy plant, 1–4 ft. high. Basal leaves long-petioled, pinnate. Stem leaves few, each of 3–7 leaflets, the latter broadly ovate and cut-toothed or serrate, downy underneath. Flowers large, in dense terminal clusters; the petals whitish or cream color. Rocky hills.

2. P. monspeliensis L. Rough Cinquefoil. Annual or biennial. Stem rough-hairy, erect and stout, 6–30 in. high. Leaves of 3 leaflets, the lower petioled, the upper stem leaves sessile or nearly so,

leaflets cut-serrate. Flowers small, in a close, leafy cyme. Styles glandular-thickened at the base. In dry soil.

3. P. rivalis Nutt., var. **millegrana**. Diffuse Cinquefoil. Annual. Stems decumbent or ascending, commonly diffusely branched, 1¼–3 ft. high, clothed with long, soft hairs or nearly smooth. Leaves all but the uppermost of 3 leaflets and petioled; leaflets oblong, wedge-shaped, thin, deeply serrate. Flowers yellow, in loose, leafy cymes. Style somewhat thickened below. In damp soil W.

4. P. argentea L. Silvery Cinquefoil. Stems prostrate or ascending and branching, woolly. Leaflets oblong, wedge-shaped, those of the upper leaves very narrow, with a few large, deeply cut teeth, smooth and green above, silvery beneath, with a dense coat of white wool. Flowers small and somewhat clustered, yellow. Dry fields and roadsides.

5. P. Anserina L. Silverweed. Stems spreading by slender runners, with many joints, silky-hairy. Leaves all basal, pinnate; leaflets 7–21, serrate, oblanceolate or obovate, nearly smooth above, white and silky-downy beneath. Flowers yellow, ½–1 in. in diameter. Style thread-like. River banks, brackish marshes, and borders of lakes.

6. P. canadensis L. Common Cinquefoil. Stems slender, procumbent, silky-hairy, sending out long runners. Leaflets obovate, wedge-shaped, appearing like 5 from the divisions of the 2 lateral ones. Peduncles 1-flowered in the axils of the leaves. Flowers yellow. Common in dry pastures and a troublesome weed.

X. FILIPENDULA Hill. (ULMARIA)

Tall perennial herbs. Leaves pinnately divided, with stipules. Flowers small, bisexual, in panicled cymes. Calyx 5-lobed. Petals 5, with claws. Stamens many, hypogynous, borne on a flat or slightly hollowed receptacle. Pistils 5–15, distinct. Carpels when ripe 1–2-seeded, looking like follicles but not splitting open.

1. F. rubra Hill. Queen of the Prairie. Smooth, branching, 2–8 ft. high. Leaves very large, of 3–7 pinnately arranged leaflets, often with smaller ones between, the lobes cut or toothed; terminal leaflet much larger, 7–9-parted. Flowers showy, pink, fragrant, about ½ in. in diameter. Meadows and prairies, especially in moist soil, sometimes cultivated.

2. F. Ulmaria Maxim. Meadowsweet. Stem 1–3 ft. high. Leaves lyrate, interruptedly pinnate, white-downy beneath. Flowers yellowish-white, small, fragrant, in a dense compound cyme. Pods spirally twisted. Cultivated from Europe and sometimes escaping.

XI. GEUM L.

Erect perennial herbs. Basal leaves crowded, pinnate, with a very large terminal leaflet. Flowers and fruit much as in *Potentilla*, but the akenes tailed with the remains of the styles. B. Fl. species 5 (*Sieversia*).

1. G. canadense Jacq. White Avens. Stem erect, branching above, smooth or finely downy, 18–24 in. high. Basal leaves pinnate, or the earliest simple and rounded, long-petioled, serrate or dentate; terminal lobe larger than the lateral lobes; stem leaves short-petioled, 2–5-lobed or -parted. Flowers on slender peduncles. Petals white, not longer than the sepals. Styles jointed near the middle, the lower portion persistent and hooked. Ovaries and receptacle hairy; head of fruit globose. Rich woods.*

2. G. virginianum L. Stem 2–3 ft. high, stout and bristly-hairy. Lower leaves and basal leaves pinnate, varying greatly; upper leaves mostly of 3 leaflets or 3-parted. Petals white or pale yellow, small, shorter than the calyx lobes. Heads of fruit large, on stout, hairy peduncles; the receptacle nearly or quite smooth. Borders of woods and damp thickets.

3. G. macrophyllum Willd. Large-Leaved Avens. Stem stout, erect, bristly-hairy, 1–3 ft. high. Basal leaves lyrate-pinnate, the terminal portion much the largest, kidney-shaped or heart-shaped; lateral leaflets 3–6, with smaller ones between. Flowers terminal, yellow. Style $\frac{1}{4}$–$\frac{1}{3}$ in. long, downy below. In low grounds.

4. G. rivale L. Water Avens, Purple Avens, Chocolate Root. Stem $1\frac{1}{2}$–2 ft. high, somewhat downy or hairy, simple or nearly so. Basal leaves lyrate and somewhat pinnate, with the divisions irregular; stem leaves few, of 3 leaflets or 3-lobed. Flowers rather large. Petals purplish-yellow, as long as the brownish-purple calyx lobes. Styles long, purplish; stigmas thread-like, feathered with soft hairs, especially in fruit. Wet meadows.

5. G. triflorum Pursh. Long-Plumed Purple Avens. Softly downy, scapes 6–18 in. high. Basal leaves petioled, tufted, pinnate; the larger leaflets obovate or oval, cut-toothed, with many smaller ones between. Flowers 3–8, light purple. Styles $1\frac{1}{2}$–2 in. long. In dry or rocky soil.

XII. RUBUS L.

Mostly prickly shrubs, producing runners. Leaves alternate, simple or compound; stipules united to the petiole. Flowers in terminal and axillary clusters, rarely solitary, white (in one American species (No. 3) purple rose color). Calyx hypogynous,

with a broad tube; its lobes 5, persistent. Petals 5. Stamens many. Carpels many, distinct, on a convex receptacle. Fruit a cluster of little 1-seeded drupes on a dry or somewhat juicy receptacle.

A. Raspberries

Grains of the fruit, when ripe, usually falling off from the receptacle and leaving the latter with the calyx.

1. R. idæus L., var. **aculeatissimus.** Red Raspberry. Stems widely branching, biennial, not rooting at the tips, armed with weak bristles and with a few hooked prickles. Leaves petioled, of 3–5 ovate leaflets which are sharply serrate and sometimes lobed, downy beneath. Flowers in terminal and axillary racemes and panicles, pedicels drooping. Fruit hemispherical or conical, red, separating easily from the receptacle. Common on mountains and burned clearings, Iowa and N., and widely cultivated.*

2. R. occidentalis L. Black Raspberry. Stems long and slender, often recurved and rooting at the tips, armed with weak, hooked prickles. Leaves petioled, 3–5 ovate leaflets, coarsely serrate, white-downy below. Flowers white, in compact terminal corymbs. Pedicels erect or ascending. Fruit black, hemispherical, separating easily from the receptacle. Common on borders of woods, Missouri and N., widely cultivated.*

3. R. odoratus L. Flowering Raspberry (often wrongly called Mulberry). Stems shrubby, rather stout, 3–5 ft. high, not prickly; the young shoots, peduncles, and calyx covered with sticky glandular hairs. Leaves large, simple, 3–5-lobed. Flowers showy, rose-purple, 1–2 in. in diameter, on many-flowered peduncles. Fruit red, flattish, eatable. Rather common E. and N., and often cultivated.

4. R. triflorus Richards. Dwarf Raspberry (also wrongly known as Mulberry). A slender, trailing plant, almost entirely herbaceous, not prickly but sometimes bristly. Leaves compound, usually of 3 but sometimes of 5 thin, ovate-lanceolate, frequently unsymmetrical leaflets, which are coarsely doubly serrate and often cleft or lobed, with a shining upper surface. Flowers small, on 1–3-flowered peduncles. Fruit usually few-grained, rather dark red, eatable, the grains adhering somewhat to the receptacle. Common, especially N., in hilly woods, often forming a dense carpet in the partial shade of pines.

B. Blackberries

Grains of the ripe fruit falling from the calyx along with the soft, eatable receptacle.

5. R. allegheniensis Porter. High Blackberry. Stem shrubby, erect or bending, 3–7 ft. high, glandular-downy above and with stout,

straightish prickles below. Leaves petioled, of 3–7 ovate leaflets which are acute, irregularly serrate, soft-hairy beneath. Flowers racemed, the lower ones leafy-bracted. Petals white, obovate, much longer than the taper-pointed sepals. Fruit long, of small drupelets. Common in thickets.*

6. R. cuneifolius Pursh. Sand Blackberry. Stem shrubby, erect or diffuse, 2–3 ft. high; prickles straight or recurved. Leaves petioled, 3–5-foliate; leaflets obovate, serrate towards the apex, wedge-shaped towards the base, rough above, white downy-woolly beneath. Racemes mainly terminal, few-flowered. Petals white, longer than the sepals. Fruit ovoid, black, smaller than the preceding. Common in old fields.*

7. R. hispidus L. Running Swamp Blackberry. Stem trailing or prostrate, often several feet in length, armed with recurved prickles. Leaves petioled, mostly of 3 leaflets; leaflets obovate, obtuse, thick, dark green and shining above. Flowering branches commonly erect, few-flowered, flowers white. Fruit small, reddish, turning nearly black. In swamps and low ground.

8. R. villosus Ait. Low Blackberry, Dewberry. Stems shrubby, trailing widely, 3–10 ft. long, somewhat prickly. Leaflets usually 3, but sometimes 5 or 7, ovate, acute, sharply (and doubly) cut-serrate, thin. Racemes upright on the short branches, 1–3-flowered. Fruit roundish, of fewer and larger grains than No. 5, very sweet when fully ripe. Common N., in stony or gravelly fields.

XIII. ROSA L.

Erect running or climbing prickly shrubs. Leaves pinnate, leaflets serrate, stipules united to the petiole. Calyx tube urn-shaped, with a rather narrow mouth. Petals (in single roses) 5. Stamens many, inserted around the inside of the mouth of the calyx tube. Ovaries many, hairy, ripening into bony akenes, inclosed in the rather fleshy and sometimes eatable calyx tube.

1. R. pratincola Greene. Stems densely prickly, 1–2 ft. high. Stipules narrow, usually with glandular teeth or a fringe of glandular hairs toward the tip; leaflets 7–11, varying from elliptical to nearly obovate, obtuse at the tip, narrowed at the base, simply toothed or serrate, rather firm and distinctly veined. Flowers usually in corymbs; sepals lanceolate, taper-pointed. Fruit globose, smooth. Prairies, especially W.

2. R. blanda Ait. Early Wild Rose. Stems 1–3 ft. high, usually without prickles; stipules broad. Flowers generally large, corymbed or solitary; sepals after flowering closing over the mouth of the calyx tube and persistent. Rocks and rocky shores.

3. R. Woodsii Lindl. Stems 3–36 in. high, with slender spines which are often wanting above. Stipules rather broad, entire; leaflets usually 5–7, varying from obovate to lanceolate, rather obtuse at the apex, narrowed at the base, somewhat serrate. Flowers corymbed or solitary. Sepals erect on the globose or somewhat ovoid fruit. Prairies W.

4. R. rubiginosa L. Sweetbrier. Stem erect or curving, armed with stout recurved prickles. Leaves with 5–7 leaflets, the latter broadly oval, coarsely serrate, glandular-bristly beneath, aromatic. Flowers white or pink. Sepals widely spreading, deciduous. Fruit obovate, slightly bristly. Common in cultivation and sometimes wild.*

5. R. carolina L. Swamp Rose. Stems 4–8 ft. high, with stout and generally recurved prickles. Stipules long and narrow; leaflets commonly downy beneath, finely serrate. Flowers several in a corymb, bright rose color. Sepals spreading and falling off after flowering. Damp woods and borders of swamps.

6. R. virginiana Mill. Dwarf Wild Rose. Stems varying in height from less than a foot to 6 ft., with stout, somewhat hooked prickles. Stipules rather broad; leaflets small, thickish and glossy above, coarsely toothed toward the tip. Flowers corymbed or solitary, pale rose color. Sepals spreading and falling off after flowering. Moist ground and swamps.

7. R. humilis Marsh. Pasture Rose. Stem erect, branched, usually armed with stout stipular prickles and with bristles, but sometimes nearly smooth, 1–3 ft. tall. Leaves mostly of 5 leaflets; stipules entire; leaflets oblong-lanceolate or oval, shining above, pale beneath, sharply serrate. Flowers solitary or 2–3 together, 2–3 in. broad, pink. Peduncles and calyx glandular-downy. Sepals leaf-like, spreading, finally deciduous. Styles distinct. Fruit globose, bristly-hairy. On dry soil; our most common wild rose. S.*

XIV. PRUNUS L.

Trees or shrubs. Leaves simple, with stipules, which are often small or fall off early. Calyx with a bell-shaped or urn-shaped tube and 5-lobed spreading limb, falling off after flowering. Petals 5; stamens 3–5 times as numerous, or indefinite, inserted on the throat of the calyx tube. Pistil 1, long-styled, with 2 ovules, ripening into a single drupe.

B. Fl. species 8 (*Amygdalus*).

A. *Stone more or less spherical; fruit smooth when ripe. Branches not spiny.* (*Cherries.*)

1. P. serotina Ehrh. Wild Black Cherry. Often becoming a large tree; bark on old trees rough, nearly black. Leaves rather

thick, oval to lanceolate-ovate, acute or taper-pointed at the apex, finely serrate with calloused teeth, smooth above, downy on the veins beneath. Racemes terminal, long and spreading. Flowers white. Fruit globose, about $\frac{1}{4}$ in. in diameter, purplish-black. In rich woods. Wood much used in cabinet-making.*

2. P. virginiana L. CHOKECHERRY. A shrub or small tree, 5–20 ft. high. Leaves thin, oval or obovate, pale, pointed, sharply serrate. Flowers small, white, in short racemes. Fruit bright red, turning at length to dark crimson, very puckery until fully ripe. River banks and thickets.

3. P. pennsylvanica L. f. WILD RED CHERRY. A tree 20–30 ft. high, with light, reddish-brown bark. Leaves oval or oblong-lanceolate, pointed, finely serrate, with both sides green, smooth and shining. Flowers long-pediceled, many in a cluster, the clusters lateral, leafless. Fruit globose, very small, light red, with thin sour pulp and globular stone. In rocky woods.

4. P. Besseyi Bailey. WESTERN SAND CHERRY. A shrub 1–4 ft. high, often with spreading and prostrate branches. Leaves usually elliptic or oblong-elliptic, with appressed teeth. Flowers sessile in lateral umbels, $\frac{1}{3}$ in. to nearly $\frac{1}{2}$ in. in diameter, opening with the leaves. Fruit black, mottled, or yellowish, $\frac{1}{2}$–$\frac{2}{3}$ in. in diameter, bitter and astringent. Prairies W.

5. P. Cerasus L. CHERRY. Often becoming a large tree. Leaves oval or ovate, acute or taper-pointed at the apex, rounded at the base, irregularly serrate-dentate, smooth on both sides, resinous when young. Flowers in lateral umbels, white; pedicels long and slender. Fruit globose, red or black. Cultivated from Europe. This is the species from which most of our sour cultivated varieties have been developed.*

B. *Stone oval, compressed; fruit smooth when ripe. Branches often spiny.* (*Plums.*)

6. P. angustifolia Marsh. CHICKASAW PLUM. A small tree with spiny branches. Leaves lanceolate or oblong-lanceolate, acute at the apex, usually obtuse at the base, finely and sharply serrate, rather thin, smooth. Flowers in lateral, sessile umbels, pedicels short. Calyx smooth. Fruit yellowish-red, subglobose, skin thin, stone only slightly compressed. In old fields S.*

7. P. americana Marsh. WILD PLUM. A small tree, bark thick and rough, branches spiny. Leaves ovate or obovate, acuminate at the apex, rounded or cordate at the base, sharply serrate, rather thick, downy beneath; petioles glandular. Flowers in lateral, sessile umbels, appearing with or before the leaves; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long, flowers $\frac{1}{2}$–$\frac{3}{4}$ in. in diameter. Calyx downy within. Fruit globose, red or yellow, $\frac{1}{2}$–1 in. in diameter. Common in woods.*

C. *Stone deeply furrowed and pitted; fruit downy when ripe. Branches not spiny.* (*Peaches and almonds.*)

8. P. persica Stokes. PEACH. A tree with a rounded top; bark nearly smooth. Leaves lanceolate, taper-pointed, finely serrate, smooth on both sides; petioles usually bearing 2 or 4 crescent-shaped or cup-shaped glands. Flowers pink, scaly-bracted. Fruit ovoid, with a seam along one side. Often escaped from cultivation.*

47. LEGUMINOSÆ. PULSE FAMILY

Herbs, shrubs, or trees. Leaves alternate, usually compound (either pinnately or palmately), with stipules, the leaflets mostly entire. Calyx of 5 sepals, which are more or less united, often somewhat zygomorphic. Corolla of 5 petals,

FIG. 20. Pulse Family

A, actinomorphic corolla (*Acacia cinerascens*); *B*, zygomorphic corolla (*Cassia marilandica*). (After Schnizlein)

often papilionaceous (Fig. 21) or somewhat actinomorphic, in No. XVI much reduced. Stamens diadelphous (Fig. 22), monadelphous, or distinct. Ovary simple, superior. Fruit usually a 1-celled pod (Fig. 22). Seeds one or several, without endosperm. A large and very important family, containing about 8000 species.

A

Flower actinomorphic, small. Stamens hypogynous. Leaves twice pinnate.

Petals not united to each other. Stamens 5 or 10. Pod smooth. Desmanthus, I

Corolla gamopetalous, 5-cleft. Stamens 8 or 10. Pod minutely prickly or rough. Schrankia, II

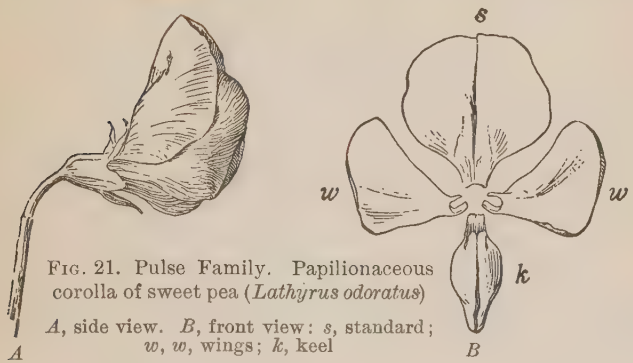


Fig. 21. Pulse Family. Papilionaceous corolla of sweet pea (*Lathyrus odoratus*)

A, side view. *B*, front view: *s*, standard; *w*, *w*, wings; *k*, keel

B

Trees. Flowers somewhat or not at all papilionaceous, sometimes almost actinomorphic. The upper petal inside the others in the bud. Stamens 10 or less, usually not united to each other, borne on the calyx.

Flowers imperfectly papilionaceous. Leaves simple. Cercis, V

Flowers not papilionaceous. Thornless. Gymnocladus, III

Flowers not papilionaceous. Thorny. Gleditsia, IV

Fig. 22

A, stamens and pistil of sweet pea (magnified); *B*, fruit; *C*, part of fruit, showing one seed

C

Herbs or trees. Flowers decidedly papilionaceous. The upper petal external in bud and inclosing the others. Stamens 10, not united to each other.

Trees.	Cladrastis, VII
Herbs. Pod inflated.	Baptisia, VI
Herbs. Pod elongated, necklace-shaped.	Sophora, VIII

D

Shrubs with a corolla of one petal only. Amorpha, XVI

E

Herbs, shrubs, or trees. Flowers decidedly papilionaceous. Stamens monadelphous or diadelphous (in the latter case usually 9 and 1).

1. Stamens with anthers of two forms.
   - (*a*) Herbs. Leaves usually with many leaflets. Lupinus, IX
   - (*b*) Herbs. Leaves with 3 entire leaflets. Psoralea, XV
   - (*c*) Trees. Laburnum, X
   - (*d*) Low shrubs. Cytisus, XI
2. Anthers all alike. Leaves usually with 3 leaflets.
   - (*a*) Pod coiled. Medicago, XIV
   - (*b*) Pod small, not coiled. Flowers in racemes. Melilotus, XIII
   - (*c*) Pod small, not coiled. Flowers in heads. Trifolium, XII
   - (*d*) Pod large, flattened, bur-like. Desmodium, XX
   - (*e*) Pod large, not much flattened. Phaseolus, XXIV
3. Anthers all alike. Leaves odd-pinnate, with more than 3 leaflets.
   - (*a*) Low, woody shrubs. Amorpha, XVI
   - (*b*) Tall, twining shrubs. Wisteria, XVIII
   - (*c*) Trees. Robinia, XVII
   - (*d*) Herbs. Astragalus, XIX
4. Anthers all alike. Leaves pinnate, the midrib prolonged into a tendril.

(*a*) Leaflets usually many pairs. Style slender, bearded only at the tip or all round the upper portion. Pod 2–several-seeded. Vicia, XXI

(*b*) Leaflets few or several pairs. Style bearded along one face only. Pod several-seeded. Lathyrus, XXII

(*c*) Leaflets 1–3 pairs. Style enlarged above, grooved on the back. Pod several-seeded; seeds large, globular or nearly so. Pisum, XXIII

I. DESMANTHUS Willd. (ACUAN)

Shrubs or perennial herbs. Stems erect or diffuse, smooth. Leaves abruptly twice-pinnate; stipules small. Flowers in heads or spikes, on axillary peduncles, the upper bisexual, the lower often staminate or neutral. Calyx 5-toothed. Corolla of 5 distinct petals or 5-cleft. Stamens 5–10, distinct. Ovary nearly sessile, flat, several-seeded.*

1. D. illinoensis Mac M. Desmanthus. Stem erect or ascending, smooth, 1–4 ft. high. Pinnæ 6–14 pairs, each with a minute gland at the base; leaflets 20–30 pairs, small, linear. Heads globose. Stamens 5. Pods several, on a peduncle 2–3 in. long, curved, flat, 2-valved, 3–6-seeded. Open, sandy fields.*

II. SCHRANKIA Willd. (MORONGIA)

Perennial herbs. Stems reclining or prostrate, prickly, 2–5 ft. long. Leaves twice-pinnate; stipules bristly. Flowers bisexual or somewhat monœcious, in axillary peduncled heads. Calyx minute. Corolla tubular, 5-cleft. Stamens 8–10, distinct. Pod long, prickly, 1-celled.*

1. S. uncinata Willd. Sensitive Brier, Sensitive Rose, Shame Vine. Plant covered with hooked prickles. Leaflets elliptical, with a conspicuous network of veins beneath; leaves closing gradually after being touched. Flowers rose-colored. Pods nearly cylindrical, 2 in. long. Dry, sandy soil and rolling prairies, especially S. and W.

III. GYMNOCLADUS Lam.

A large, thornless tree, its twigs few and stout. Leaves very large, twice pinnately compound, without stipules. Flowers actinomorphic, whitish, diœcious or somewhat monœcious, in

racemes at the ends of the branches. Calyx tube rather long, its 5 lobes spreading. Petals oblong, all alike, inserted with the stamens on the throat of the calyx. Stamens of the fertile flowers usually not pollen-bearing. Pod hard, flat, partly filled with a sweet substance, slow in opening. Seeds several, flattish, over ½ in. in diameter, very hard and shining.

1. G. dioica Koch. Kentucky Coffee Tree. Tree 50 ft. or more in height, with rough gray bark. Leaves 2–3 ft. long, the leaflets vertical. Pods sometimes nearly 1 ft. long. Rich soil and river bottoms, especially S. and W.

IV. GLEDITSIA L.

Large trees; bark dark-colored, nearly smooth. Leaves usually pinnately twice compound; leaflets serrate. Flowers somewhat monœcious, in small spike-like racemes. Calyx spreading, 3–5-cleft. Petals as many as the sepals and inserted at the summit of the tube. Stamens 5–10, distinct, inserted with the petals. Ovary nearly sessile, ovoid or elongated. Fruit a 1-or many-seeded, leathery pod.*

1. G. triacanthos L. Honey Locust. A large tree, usually armed with stout, branched thorns, which are sometimes a foot or more in length. Leaves petioled; leaflets short-stalked, lanceolate-oblong, base inequilateral, smooth above, often downy below. Racemes solitary or in small clusters, drooping. Flowers inconspicuous, greenish. Pod linear-oblong, often 12–15 in. long by 1 in. wide, twisted, many-seeded, smooth and shiny, pulpy within. In rich woods.

V. CERCIS L.

Trees. Leaves simple, with stipules. Flowers in axillary clusters, somewhat papilionaceous. Calyx bell-shaped, 5-toothed. Stamens 10, distinct. Ovary short-stalked; ovules several. Fruit a flattened pod.

1. C. canadensis L. Redbud. A small tree, 10–20 ft. high; wood hard but weak; bark smooth, dark-colored. Leaves broadly cordate, abruptly acute, rather thick, very smooth above, often slightly downy below. Flowers several in a cluster, appearing before the leaves, pinkish-purple. Pod oblong, compressed, many-seeded. Common on rich soil, especially S.*

VI. BAPTISIA Vent.

Perennial herbs; stems erect, widely branched. Leaves simple or palmate, of 3 leaflets. Flowers in racemes. Calyx 4–5-lobed, persistent, the upper lobe usually longer and notched; standard rounded, its sides reflexed, wings about as long as the keel. Stamens 10, distinct. Pod stalked, long-pointed by the remains of the style. Plants usually becoming black in drying.*

1. B. tinctoria R. Br. WILD INDIGO. Stem smooth, slender, 2–4 ft. high; branches slender. Leaves of 3 leaflets, on short petioles, the upper nearly sessile; stipules minute, quickly deciduous. Leaflets obovate to oblanceolate, obtuse at the apex, wedge-shaped at the base, entire. Racemes numerous, terminal. Flowers yellow, $\frac{1}{2}$ in. long. Pod globose, ovoid, on a stalk about the length of the calyx, point long and slender. Plant blackening in drying. Common on dry, sandy soil.*

2. B. bracteata Muhl. Low, hairy, and branching. Leaves nearly sessile; leaflets oblanceolate or obovate-spatulate; stipules triangular-ovate, large, persistent; bracts large and leaf-like. Racemes long. Flowers large, yellowish-white. Pod ovoid, swollen. Prairies and open woods W. and S.

3. B. leucantha T. & G. Stout, smooth, and covered with a bloom, 3 ft. or more high, with spreading branches. Petioles short; lanceolate stipules and bracts falling off early. Racemes erect. Flowers large, white. Pods ellipsoidal, 2 in. long, borne on a stalk twice as long as the calyx. Rich river bottoms and prairies.

4. B. alba R. Br. WHITE WILD INDIGO. Stem smooth and with a bloom, often purple, 2–3 ft. high; branches slender, spreading. Leaves petioled, with 3 leaflets; stipules minute, soon deciduous. Flowers white, mostly in a single raceme which is 1–3 ft. long, with occasionally lateral, few-flowered racemes. Pod linear-oblong, the point very slender and soon deciduous. Plant unchanged in drying. In damp soil.*

5. B. australis R. Br. BLUE FALSE INDIGO. Stem smooth, stout, 2–4 ft. high. Leaves of 3 leaflets, short-petioled; stipules lanceolate, persistent, longer than the petioles; leaflets oblong, wedge-shaped or narrowly obovate, entire. Flowers bright blue, 1 in. long, in terminal, erect, loosely flowered racemes; stalk about the length of the calyx. Pod oblong, with a slender, persistent point. Banks of rivers; often cultivated for ornament.*

VII. CLADRASTIS Raf.

A moderate-sized tree, with smooth dark gray bark and yellow wood. Leaves of 7–11 smooth oval or ovate leaflets.

Flowers creamy-white, in long, drooping panicles. Calyx 5-toothed. Standard large, nearly round, reflexed; petals of the keel and wings separate and straight. Stamens 10, unconnected with each other. Pod borne on a short stalk above the calyx. Seeds 4–6.

1. C. lutea Koch. YELLOW WOOD. Tree 50 ft. or less in height, much branched, with a round, spreading top. Hillsides, in fertile soil, south central states. Also considerably planted as a shade tree.

VIII. SOPHORA L.

Shrubby or herbaceous perennials. Leaves odd-pinnate, with many leaflets. Calyx bell-shaped, with 5 short teeth. Standard roundish; keel nearly straight. Stamens almost or quite distinct; anthers versatile. Pod stalked, leathery or fleshy, nearly cylindrical but more or less contracted between the seeds, not splitting open.

1. S. sericea Nutt. Herbaceous with a woody base, erect, 6–12 in. high, covered with silky silvery down. Leaflets 7–25, obovate or nearly so, obtuse, narrowed at the base, $\frac{1}{4}$–$\frac{1}{2}$ in. long. Flowers white. Pod slender, dry, few-seeded. Prairies W. and S.W.

IX. LUPINUS L.

Biennial or perennial herbs. Leaves simple or palmately compound. Flowers showy, in terminal racemes. Calyx 2-lipped, 5-toothed. Standard round, with the sides reflexed; keel scythe-shaped. Stamens monadelphous; anthers alternately oblong and roundish. Ovary sessile; matured pod oblong, several-seeded, often compressed between the seeds.*

1. L. perennis L. Perennial. Stem erect, downy, 12–18 in. high. Leaves palmately 7–9-foliate; leaflets obovate or oblanceolate, obtuse and mucronate at the apex, slightly downy; petiole slender; stipules small. Racemes terminal, slender, loosely many-flowered. Flowers purple, blue, pink, or white. Pod oblong, densely downy, few-seeded. Dry, sandy soil.*

X. LABURNUM Medic.

Trees or shrubs. Leaves of 3 leaflets, with very small stipules or none. Flowers golden-yellow, in slender, drooping racemes. Calyx 2-lipped, the upper lip 2-toothed, the lower 3-toothed. Standard ovate, upright, of the same length as the

straight wings. Stamens diadelphous (9 and 1). Ovary and pod somewhat stalked above the calyx, several-seeded.

1. L. vulgare Griseb. Laburnum, Golden Chain. A small tree, with smooth, greenish bark. Leaves with slender petioles; leaflets oblong-ovate, acute at the base, taper-pointed, downy beneath. Flowers showy, in graceful racemes. Cultivated from Europe.

XI. CYTISUS L.

Shrubs, rarely spiny. Leaves of 1–3 leaflets or none; stipules very small. Calyx 2-lipped, the upper lip slightly 2-toothed, the lower 3-toothed. Keel straight or a little curved, blunt, turned down after flowering. Stamens with their filaments all united; anthers every other one short and attached by its center, the alternate ones long and fastened by their bases. Style curved in, or, after the flower opens, coiled up. Pod flat, long, many-seeded.

1. C. canariensis Dumont. A shrub with many rather stiff, erect, slender branches. Leaves abundant, very small, covered with soft gray hairs; leaflets 3, obovate. Flowers rather small, yellow, in somewhat erect racemes. Cultivated in greenhouses. From the Canary Islands.

XII. TRIFOLIUM L.

Annual, biennial, or perennial herbs. Stems more or less spreading. Leaves petioled, of 3 toothed or serrate leaflets; stipules united to the petioles. Flowers white, yellow, or red, in heads. Calyx 5-cleft, the teeth nearly equal, awl-shaped. Petals withering-persistent; keel shorter than the wings. Stamens diadelphous. Pod smooth, 1–6-seeded, scarcely opening.*

1. T. arvense L. Rabbit Foot Clover, Stone Clover. Annual, silky-downy, erect, branching, 5–10 in. high. Leaflets oblanceolate or linear, minutely toothed above. Heads terminal, peduncled. Calyx teeth very silky-hairy, longer than the whitish corolla. Old fields, railroad embankments, and waste ground. Naturalized from Europe.

2. T. incarnatum L. Crimson Clover. Annual. Stem erect, somewhat branched, downy, 1–2 ft. high. Lower leaves long-petioled, the upper short-petioled; leaflets obovate or wedge-shaped, toothed at the apex. Flowers bright crimson, sessile, in terminal heads which finally become much elongated. Calyx silky, its lobes long and plumose. Introduced from Europe and cultivated for fodder.

3. T. pratense L. Red Clover. Biennial or short-lived perennial. Stems spreading, branching, downy, 1–3 ft. long. Leaves long-petioled; stipules large; leaflets oval to obovate, finely toothed, often with a dark triangular spot near the center. Flowers red or purple, in globose heads, erect in fruit. Calyx teeth bristle-shaped, hairy. Pod 1–3-seeded. Introduced from Europe and widely cultivated.*

4. T. repens L. White Clover. Perennial. Stems widely branching at the base, prostrate and creeping, nearly smooth, 6–12 in. long. Leaves long-petioled; leaflets oval, obovate, or obcordate, minutely toothed. Heads globose, long-peduncled. Flowers white, reflexed in fruit. Pod 3–4-seeded. Common about houses and in pastures.*

5. T. hybridum L. Alsike Clover. Perennial, considerably resembling No. 4, but the stems more upright and stouter. Leaflets varying from broadly ovate to ovate-lanceolate, mucronate or slightly notched, the margins fringed with hairs; stipules prolonged into bristle-like points. Flowers rose color and white, very fragrant. In fields and along roadsides. Introduced from Europe.

6. T. carolinianum Michx. Carolina Clover. Perennial. Stems spreading or ascending, much-branched, downy, 6–10 in. long. Leaves short-petioled; leaflets small, obovate or obcordate, slightly toothed. Heads small, globose, on long peduncles. Flowers white, tinged with purple, reflexed in fruit. Pod 4-seeded. Common in waste places S.*

7. T. procumbens L. Low Hop Clover. Annual. Stem slender, erect or spreading, downy, 6–10 in. long. Leaves short-petioled; leaflets obovate or obcordate, finely dentate, the middle one distinctly stalked; stipules lance-ovate. Flowers yellow, reflexed in fruit. Pod 1-seeded. Common on clay soil, in waste places. Naturalized from Europe.*

XIII. MELILOTUS Hill.

Annual or biennial herbs. Leaves petioled, of 3 leaflets. Flowers small, white or yellow, in dense axillary and terminal racemes. Calyx 5-toothed, the teeth nearly equal. Standard erect, wings and keel cohering. Stamens 10, diadelphous. Pod longer than the calyx, 1–4-seeded.*

1. M. alba Lam. Melilotus. Biennial. Stem erect, branching, smooth or the young branches slightly downy. Leaflets oblong or oblanceolate, rounded or truncate at the apex, serrate; stipules small. Racemes long, slender, erect. Flowers white. Standard longer than the wings and keel. Pod ovoid, wrinkled, drooping, mostly 1-seeded, scarcely opening. Common as a weed and widely cultivated.*

2. M. officinalis Willd. YELLOW SWEET CLOVER. A stout, upright, branching herb, 2–4 ft. high, looking much like the preceding species, but coarser. Flowers yellow. Waste ground and roadsides. Naturalized from Europe.

XIV. MEDICAGO L.

Annual or perennial herbs. Leaves petioled, of 3 toothed leaflets. Flowers in terminal and axillary spikes or racemes. Calyx 5-toothed, the teeth short and slender. Standard oblong, much longer than the wings or keel. Stamens 10, diadelphous. Ovary sessile. Pod 1–several-seeded, coiled, not splitting open, often spiny.*

1. M. sativa L. ALFALFA. Perennial. Stems erect, branching, downy when young, becoming smooth with age, 2–3 ft. high. Leaves short-petioled; leaflets obovate, sharply dentate towards the apex, obtuse or sometimes notched or mucronate; stipules lanceolate, entire. Flowers blue, small, in rather close spikes. Pods downy, coiled, few-seeded. Introduced from Europe, and cultivated for hay and pasture.*

2. M. lupulina L. BLACK MEDICK, NONESUCH. An annual or biennial, much-branched, reclining herb, with stems 6–20 in. long. Leaves very short-petioled; leaflets obovate, acute, $\frac{1}{4}$–$\frac{2}{3}$ in. long, toothed near the tip. Flowers small, yellow, in short spikes. Pods very small, 1-seeded, kidney-shaped, black. Roadsides and waste ground, adventive from Europe.

XV. PSORALEA L.

Perennial herbs; whole plant glandular-dotted. Leaves of 3–5 leaflets; stipules united with the petioles. Flowers in axillary or terminal spikes or racemes. Calyx 5-cleft, the lobes nearly equal. Standard ovate or orbicular; keel incurved, obtuse. Stamens monadelphous or diadelphous, 5 of the anthers often undeveloped. Ovary nearly sessile. Pod included in the calyx, often wrinkled, remaining closed, 1-seeded.*

1. P. pedunculata Vail. SAMSON'S SNAKEROOT. Stem erect, slender, branching above, downy, 1–2 ft. high. Leaves of 3 leaflets; petioles shorter than the leaflets; stipules awl-shaped; leaflets elliptical or oblong-lanceolate, sparingly glandular-dotted, the terminal one stalked. Loosely flowered spikes axillary and terminal, on peduncles much longer than the leaves. Flowers blue or purple, about $\frac{1}{3}$ in. long. Pod compressed-globose, wrinkled transversely. Dry soil.*

2. P. tenuiflora Pursh. Upright, slender, bushy and branching, 2–4 ft. high, covered when young with a fine grayish down. Leaves

palmately compound, with 3–5 linear to obovate-oblong leaflets, covered with glandular dots. Flowers $\frac{1}{3}$–$\frac{1}{2}$ in. long, loosely racemed. Pod rough with glands. Prairies W.

3. P. argophylla Pursh. Silver-Leaved Psoralea. Densely silvery downy, with white, close-lying hairs. Stem often zigzag, 1–3 ft. high. Leaves palmate; leaflets 3–5, elliptical-lanceolate, oval or obovate. Spikes interrupted, the peduncles longer than the leaves. Flowers blue or purplish, $\frac{1}{3}$ in. or more long. Pod ovate, beak straight. Prairies, especially N.W.

4. P. esculenta Pursh. Pomme Blanche, Tipsin, Dakota Turnip. Clothed with roughish hairs. Stem 5–15 in. high, erect and stout. Root turnip-shaped, starchy, eatable. Leaves palmately compound, with 5 lance-oblong leaflets. Flowers $\frac{1}{2}$ in. long, in a dense ellipsoidal spike. Pod hairy, with a pointed tip. High prairies or plains, especially N.W.

XVI. AMORPHA L.

Small shrubs, glandular-dotted. Leaves odd-pinnate. Flowers purple, blue, or white, in slender spikes or racemes. Calyx 5-toothed, persistent. Standard obovate, concave; wings and keel none. Stamens monadelphous, projecting much. Ovary sessile. Pod curved, glandular-roughened, 1–2-seeded, never opening.*

1. A. canescens Pursh. Lead Plant, Shoe Strings. A bushy, white, silky-downy shrub, 1–3 ft. high. Leaflets small and crowded, 21–49, oval or oblong-elliptical. Spikes mostly clustered at the summit, rather showy. Standard bright blue, roundish. Pod 1-seeded, slightly longer than the calyx. Prairies. Roots very long and tough, hence one common name.

2. A. microphylla Pursh. A bushy shrub about 1 ft. high. Leaves many, short-petioled; leaflets 13–19, rigid, oval or oblong. Racemes mostly solitary. Flowers fragrant; standard purplish. Prairies, especially N.W.

3. A. fruticosa L. False Indigo. A shrub, 6–15 ft. high, with smooth, dark-brown bark. Leaves petioled; leaflets 15–21, short-stalked, oblong, obtuse or notched, sparingly punctate with clear dots. Slender flowering spikes, panicled or solitary, 4–6 in. long. Flowers blue or purple. Calyx teeth short, nearly equal, downy. Pod glandular. River banks.*

XVII. ROBINIA L.

Trees or shrubs. Leaves odd-pinnate; stipules often spiny. Flowers showy, in axillary racemes. Calyx short, 5-toothed,

the two upper teeth shorter and partially united. Standard large, orbicular, reflexed, keel obtuse. Stamens diadelphous. Style bearded on one side. Pod compressed, several-seeded.*

1. R. Pseudo-Acacia L. BLACK LOCUST. A tree of medium size; bark rough and nearly black; twigs and leaves smooth. Leaflets 9–15, ovate or oblong, obtuse and slightly mucronate at the apex; stipules forming persistent spines. Racemes loose, pendulous, 3–5 in. long. Flowers white, fragrant. Pod smooth, 4–8-seeded. Introduced, and quite common; wood very durable when exposed to the weather, and extensively used for posts.*

XVIII. WISTERIA Nutt. (BRADLEYA)

Tall, twining shrubs. Leaves odd-pinnate. Racemes terminal. Flowers large and showy. Calyx 2-lipped, the upper lip 2-cleft, short, the lower longer and 3-cleft. Standard large, round, with 2 calloused ridges at the base; wings eared at the base; keel scythe-shaped. Pod long, stalked, leathery, 2-valved, several-seeded.*

1 W. frutescens Poir. WISTERIA. Stem climbing 30–40 ft., often 2–3 in. in diameter at the base; branches and leaves downy when young, becoming smoother with age. Leaves short-petioled; stipules minute; leaflets 9–17, ovate-lanceolate, acute at the apex, rounded at the base. Racemes large, densely flowered. Calyx downy. Corolla lilac-purple, wings with a short and a long appendage at the base. Pod 2–3 in. long, 2–4-seeded. River banks S. Often cultivated for ornament.*

2. W. chinensis DC. CHINESE WISTERIA. Larger and faster growing than No. 1. Racemes longer and more slender. Wing appendage at one side only of base. Seldom fruiting in this region. Cultivated from China or Japan.

XIX. ASTRAGALUS L.

Mostly perennial herbs. Leaves odd-pinnate. Flowers in spikes or racemes. Calyx 5-toothed. Petals long, erect, with claws. Standard narrow. Stamens diadelphous (9 and 1). Pod usually swollen, sometimes fleshy and eatable, several–many-seeded. [A large and very difficult genus; mostly of far western species.]

1. A. caryocarpus Ker. GROUND PLUM, BUFFALO APPLE. Covered with pale, close-lying down. Leaflets narrow, oblong. Flowers violet-purple, in a short, narrow raceme. Fruit looking like a small, green, pointed plum, about $\frac{2}{3}$ in. in diameter, eatable. N.W., and S. to Texas.

2. A. mexicanus A. DC. PRAIRIE APPLE. Smooth or with some loose hairs. Corolla cream color, with the tip bluish. Fruit globular, not pointed, eatable. Prairies, Illinois and S.W.

3. A. canadensis L. Erect, often tall (1–4 ft. high), more or less downy. Leaflets oblong, 21–27. Flowers pale greenish, in long spikes. Pod dry, 2-celled, sessile. River bottoms, prairies, and woods.

4. A. parviflorus MacM. Erect and slender, finely downy, somewhat ash-color, 1–2 ft. high. Leaflets 11–21, linear, obtuse, distant. Flowers purple, $\frac{1}{4}$–$\frac{1}{3}$ in. long, in long, slender racemes. Pods sessile, $\frac{1}{4}$ in. or less in length, concave on the back, white-hairy, becoming smooth. Prairies, especially N.W.

XX. DESMODIUM Desv. (MEIBOMIA)

Perennial herbs. Leaves pinnate, with stipules, usually with 3 leaflets. Flowers in axillary or terminal racemes, or sometimes in panicles, usually purple, sometimes pink or whitish. Calyx usually somewhat 2-lipped. Standard ovate, obovate, or roundish; wings attached to the straight or nearly straight keel by a little appendage projecting from each side of the keel. Stamens monadelphous (9 and 1) or all united at their bases. Pod flat, its lower margin variously lobed, separating into flat segments which are usually furnished with short, strong, hooked hairs, making the fruit a troublesome bur. [A large and rather difficult genus. Most of the species can only be distinguished by the fruit, which matures in late summer or autumn.]

XXI. VICIA L.

Climbing or spreading herbs. Leaves odd-pinnate, usually ending in a tendril. Leaflets many, entire or toothed at the tip; stipules half arrow-shaped. Flowers blue, purple, or yellow, in axillary racemes. Calyx teeth nearly equal. Wings united to the keel. Stamens diadelphous (9 and 1); filaments thread-shaped; anthers all alike. Style bent, smooth or downy all round or bearded below the stigma; ovules usually many. Pod flattened, 2–several-seeded. Seeds globular.

1. V. sativa L. Common Vetch. Annual. Stem simple, smooth, reclining, 1–3 ft. long. Leaves short-petioled; leaflets 2–5 pairs, obovate-oblong to linear, obtuse, notched and mucronate at the apex. Flowers in pairs, nearly sessile in the axils, pale purple, ¾ in. or less in length. Pod linear, several-seeded. In gravelly soil. Introduced from Europe.

2. V. caroliniana Walt. Perennial. Smooth or nearly so, 4–6 ft. high. Leaflets 8–24, narrowly oblong, blunt. Peduncles loosely flowered. Flowers small, whitish or tipped with pale purple. River banks.

3. V. americana Muhl. Wild Vetch, Buffalo Pea. Perennial. Smooth, 1–3 ft. high. Leaflets 10–14, elliptical or ovate-oblong, obtuse. Peduncles shorter than the leaves, 4–8-flowered. Flowers bluish-purple, ¾ in. long. Common N. and W.

XXII. LATHYRUS L.

Like *Vicia*, excepting that the leaflets are fewer and the style is bearded on the side toward the standard.

1. L. maritimus Bigelow. Beach Pea. Perennial. Stem stout, 1–2 ft. high. Stipules broadly ovate and heart- or halberd-shaped, nearly as large as the 6–12 leaflets, of which the lower pair is the largest; tendrils pretty large. Flowers large, blue or purple. Seashores and beaches of the Great Lakes.

2. L. palustris L. Wild Pea. Stem frequently winged, slender, and climbing by delicate tendrils at the ends of the leaves. Stipules narrow and pointed; leaflets 4–8, narrowly oblong to linear, acute. Peduncles bearing 2–6 pretty large, drooping, blue, purple, and white flowers. Damp thickets and borders of swamps.

3. L. venosus Muhl. Veiny Vetch. Perennial. Stem stout, prominently angled, climbing or reclining, 2–5 ft. long. Leaves short-petioled; stipules large, lanceolate; leaflets 5–7 pairs, broadly ovate-obtuse, mucronate. Peduncles nearly as long as the leaves, many-flowered. Flowers purple, ¾ in. long. Calyx teeth very unequal. Pod linear, veined, 4–6-seeded. Shady banks and moist prairies.*

4. L. odoratus L. Sweet Pea. Annual. Stem roughish-hairy, it and the petioles winged. Leaflets only one pair, oval or oblong. Flowers large, 2 or 3 on the long peduncles, sweet-scented, white, rose color, purple, or variegated. Cultivated from Europe.

XXIII. PISUM L.

Climbing or prostrate herbs. Style enlarged above, grooved on the back, with soft-hairy down on the inner edge. Leaflets 1–3 pairs. Flowers and fruit much like those of *Lathyrus*.

1. **P. sativum** L. Common Pea. Annual. Smooth and covered with a bloom. Leaflets usually 2 pairs; tendrils branching; stipules large, ovate, rather heart-shaped at the base. Peduncle several-flowered. Flowers white, bluish, reddish, or variegated. Pods large; seeds globular or somewhat flattened and wrinkled. There are many varieties, differing greatly in size, of the plant and of the fruit. Cultivated from Europe (?).

XXIV. PHASEOLUS L.

Twining herbs. Leaves pinnate, of 3 leaflets. Flowers in axillary racemes. Calyx 5-toothed or 5-cleft, the two upper teeth often more united than the others. Keel of the corolla coiled in a spiral, together with the included stamens and style. Stamens diadelphous (9 and 1). Style bearded lengthwise on the upper side; stigma oblique or on the side of the style. Pod linear, 2-valved, several–many-seeded, tipped with the remains of the style.

1. **P. perennis** Walt. Wild Bean. Perennial, climbing high. Flowers small, purple. Pods curved, drooping, 4–6-seeded. Thickets.

2. **P. vulgaris** L. Common or Kidney Bean. Twiners (or some varieties low and branching). Racemes of white or purplish flowers shorter than the leaves. Pods straight or nearly so. Seeds not much flattened. Cultivated, probably from tropical America.

3. **P. multiflorus** Willd. Spanish Bean, Scarlet Runner. Stems twining high. Flowers large and showy, white, scarlet, or variegated; racemes longer than the leaves. The scarlet variety is the most commonly cultivated, for ornament. From tropical America.

48. GERANIACEÆ. Geranium Family

Herbs or small shrubs. Leaves simple, usually with glandular hairs which secrete an aromatic oil. Flowers bisexual, axillary and solitary or clustered, actinomorphic or nearly so, hypogynous, their parts in fives. Stamens 5 or 10, monadelphous at the base. Carpels 5, each 2-ovuled, splitting away with their long styles when ripe from a central axis and thus scattering the seeds.

I. GERANIUM L.

Herbs, rarely shrubs. Leaves with stipules, opposite or alternate, usually cut or lobed. Flowers actinomorphic on

1–2-flowered axillary peduncles. Sepals and petals 5. Stamens 10, ripening in 2 sets. Ovary 5-lobed, 5-beaked; stigmas 5.

1. G. **maculatum** L. Wild Crane's-Bill, Wild Geranium. Perennial, with an erect, hairy stem, 12–18 in. high. Leaves about 5-parted, marked with pale blotches, the basal leaves long-petioled. Flowers large (1 in. or more in diameter), light purple, somewhat corymbed. Petals entire, twice as long as the calyx, the claw bearded. Open woods and thickets; common.

2. G. **Robertianum** L. Herb Robert. Annual or biennial. Stems somewhat hairy, weak and spreading, reddish. Leaves of 5 leaflets, the latter once or twice pinnately cut, long-petioled. Flowers light purple, about ½ in. in diameter, streaked with dark and light red. Claws of petals smooth. Damp woods and ravines E.

II. PELARGONIUM L'Her.

Perennial herbs or shrubs. Leaves with stipules, scented. Flowers much as in the preceding genus, but one of the sepals hollowed out below into a nectar-bearing tube extending down the pedicel. The 2 upper petals different in size or shape from the other 3. Cultivated from the Cape of Good Hope. [Most of the species are commonly, though not quite correctly, called "geraniums." Only a few of the commonest are here described.]

1. P. **peltatum** Ait. Ivy Geranium. Stems somewhat prostrate and trailing. Leaves somewhat peltate, smooth or nearly so. Flowers pink or white.

2. P. **zonale** Willd. Horseshoe Geranium. Stem erect, widely branched, woody below. Leaves alternate, opposite or sometimes in threes, round or kidney-shaped, palmately veined, crenate, downy, usually with a dark zone near the middle. Flowers in a long peduncled umbel, showy, red or white, often double. Numberless varieties in cultivation.

3. P. **graveolens** Ait. Rose Geranium. Stem erect or ascending, densely downy, 1–3 ft. high. Leaves alternate, palmately lobed or divided, the lobes often finely dissected, rolled under at the edges. Flowers umbeled, small, light purple with darker veins; whole plant very fragrant. Common in cultivation.

4. P. **odoratissimum** Ait. Nutmeg Geranium. Branches crooked and straggling from a very short, moderately stout main stem. Leaves small, roundish and scalloped, covered with velvety down, very fragrant. Flowers white, inconspicuous, on short pedicels the petals hardly longer than the calyx.

49. OXALIDACEÆ. Wood Sorrel Family

Herbs or woody plants. Leaves compound. Flowers in fives, bisexual, actinomorphic, hypogynous. Stamens 10, somewhat monadelphous at the base. Ovary with several ovules in each cell. Fruit a capsule.

OXALIS L.

Acid herbs. Leaves basal or alternate, with or without stipules, usually of 3 leaflets, which droop at night. Sepals 5. Petals 5. Stamens 10. Ovary 5-lobed, 5-celled; styles 5.

1. O. Acetosella L. Wood Sorrel. Apparently stemless, from a creeping, scaly rootstock. Leaves all basal, long-petioled, of 3 inversely heart-shaped leaflets; scape slender, 2–5 in. high, 1-flowered. Flowers nearly 1 in. in diameter, white, veined with red or purple. Cold woods N.

2. O. violacea L. Violet Wood Sorrel. Perennial from a bulbous root, apparently stemless. Leaves long-petioled; leaflets inversely heart-shaped, sometimes slightly downy, often with a dark zone near the middle. Scapes usually longer than the petioles, umbellately 4–10-flowered; pedicels slender. Flowers violet-purple, nodding. Petals obtuse, 2–3 times as long as the sepals; scapes and petioles 4–5 in. long. Common in rich woods.*

3. O. corniculata L. Common Yellow Wood Sorrel. Probably flowering the first year but perennial, propagated by slender whitish rootstocks. Erect or decumbent, often sparsely hairy, usually 1 ft. or less in height. Stem leafy, the leaves often appearing whorled. Leaflets thin, green or purplish, often ciliate. Peduncles few-flowered, the ascending pedicels, clad with spreading hairs, forming unsymmetrical umbels or cymes at their summits. Flowers yellow, about $\frac{1}{3}$ in. in diameter. Pods hairy, columnar, grooved, often $\frac{1}{2}$ in. or more in length. A common weed in light soil.

50. TROPÆOLACEÆ. Indian Cress Family

Smooth and tender herbaceous plants, with biting juice, often climbing by the petioles of their simple leaves. Leaves alternate, without stipules. Peduncles axillary, 1-flowered. Sepals 3–5, the upper one with a long, distinct spur. Petals 1–5, hypogynous, not always all alike. Stamens 6–10, perigynous,

distinct. Ovary 1, 3-angled, made up of 3–5 1-ovuled carpels; style 1; stigmas 3–5. Fruit not opening.

TROPÆOLUM L.

Characteristics of the genus those of the family above given, together with the following:

Petals usually 5, clawed, the 2 upper inserted at the mouth of the spur and unlike the 3 lower ones. Stamens 8, ripening unequally, the filaments curved. Fruit 3-celled, 3-seeded. Cultivated from S.A. for the very showy flowers and the sharp-flavored fruits, which are often pickled.

1. T. majus L. Common Nasturtium. Climbing by the petioles 6–8 ft. (there is also a low variety which does not climb). Leaves roundish but more or less 6-angled, peltate, with the petiole attached near the middle. Flowers varying from almost white to nearly black, but commonly crimson, scarlet, or flame color.

51. LINACEÆ. Flax Family

Herbs, shrubs, or trees. Leaves usually alternate, simple, entire, sometimes with stipules. Flowers variously clustered. Sepals 5, distinct or united. Petals 5, hypogynous. Stamens 5, monadelphous below. Pod 8–10-seeded, with twice as many cells as there are styles.

LINUM L.

Herbs or small shrubs, with tough, fibrous bark. Leaves sessile. Flowers in corymbs or panicles. Sepals 5, entire. Petals 5, distinct or united below, falling in a few hours after expanding.

1. L. usitatissimum L. Common Flax. Stem erect, with corymbed branches at the top. Leaves narrowly lanceolate. Flowers handsome, large, blue. Cultivated for the fiber. From Europe; introduced here to some extent.

2. L. virginianum L. Wild Flax. Stem rather slender, erect and cylindrical; branches cylindrical. Leaves small, varying from oblong to lanceolate or spatulate, the lower often opposite. Flowers small, yellow. Capsules flattened at right angles to the pedicels. Dry woods and pastures.

52. RUTACEÆ. Rue Family

Shrubs or trees. Leaves alternate, compound, without stipules, marked with translucent dots. Flowers usually actinomorphic. Sepals and petals 3–5 or none ; petals hypogynous or perigynous when present. Stamens as many or twice as many as the sepals, inserted on the glandular disk. Pistils 2–5, often partially united. Fruit a capsule, a key fruit, or in the important genus *Citrus* (orange, lemon, lime, etc., not here described) a leathery-skinned berry, the outer part of the skin containing many spherical oil cavities.*

I. XANTHOXYLUM

Trees or shrubs ; bark, twigs, and petioles usually prickly ; leaves odd-pinnate, marked with translucent dots. Flowers in axillary or terminal cymes or umbels, monœcious or diœcious. Sepals and petals 3–5 or none. Stamens 3–5, hypogynous. Pistils 2-5, distinct. Carpels 2-valved, 1–2-seeded; seeds smooth and shining.*

1. **X. americanum** Mill. Northern Prickly Ash, Toothache Tree. A prickly shrub, 8–12 ft. high, with aromatic bark. Leaves pinnately compound; leaflets ovate-oblong. Flowers small and greenish, in axillary umbels, appearing before the leaves. Petals 4–5. Pistils 3–5, the styles slender. Pods rather globose, somewhat more than ⅛ in. in diameter, roughish, borne on a short stalk above the receptacle, with a strong scent of lemon and tasting at first aromatic, then burning. Rocky woods, ravines, and river banks.

II. PTELEA L.

Shrubs with smooth and bitter bark. Leaves with 3 leaflets. Flowers in terminal cymes, somewhat monœcious. Sepals 3–6, deciduous, much shorter than the petals. Stamens 4–5, longer than the petals and alternate with them. Pistillate flowers producing imperfect stamens. Ovary compressed, 2-celled. Fruit a 2-celled, 2-seeded, broadly winged key.*

1. **P. trifoliata** L. Hop Tree, Wafer Ash. A shrub 4–8 ft. high. Leaves long-petioled; leaflets oval or ovate, acute, obscurely serrate,

the lateral ones oblique. Cymes compound. Flowers greenish. Stamens mostly 4; filaments bearded; key about 1 in. in diameter; wing notched, strongly netted-veined. Rocky banks; often cultivated.*

53. POLYGALACEÆ. Polygala Family

Herbs or shrubs. Leaves alternate or nearly opposite, without stipules, simple. Flowers not actinomorphic. Sepals unequal, the 2 inner wing-shaped and petal-like. Petals 3–5, hypogynous, the 2 lateral ones often united with the hooded lower one into a tube, split open at the base behind. Stamens 8; filaments united into a split sheath, which is usually joined to the petals; anthers usually opening by pores. Ovary 2-celled, 2-ovuled. [A difficult family for the beginner.]

POLYGALA L.

Herbs or shrubs. Flowers racemed or spiked, some of them often cleistogamous. Petals united below to the stamen sheath. Anthers opening by transverse pores.

1. P. paucifolia Willd. Fringed Polygala, Babies' Toes, May Wings. A low perennial herb, with branches 3–4 in. high, from a slender, creeping rootstock. Lower leaves scattered, small and scale-like, the upper ones with petioles, crowded near the tips of the branches, ovate or nearly so. Flowers of two kinds, the cleistogamous whitish, fertile, borne underground along the rootstock, the terminal flowers large and showy (nearly an inch long), rose-purple, with a beautiful fringed crest. Woods, especially N. and E.

2. P. Senega L. Seneca Snakeroot. A perennial herb, with several erect stems arising from stout, hard, knotty rootstocks. Leaves lanceolate, oblong or lance-ovate, sessile. Flowers all alike, small, white, in solitary close spikes. Rocky woods.

54. EUPHORBIACEÆ. Spurge Family

Herbs, shrubs, or trees, usually with a milky, more or less acrid and sometimes poisonous juice. Flowers mostly apetalous, monœcious or diœcious (Fig. 23). Ovary usually 3-celled, with 1 or 2 ovules in each cell; stigmas as many as the cells

or twice as many. Fruit a 3-lobed capsule. Seeds containing fleshy or oily endosperm. Most of the family are natives of hot regions, many of them of peculiar aspect from their adaptation to life in dry climates. [The family is too difficult for the beginner in botany to determine many of its genera and species with certainty, but a few are described below.]

I. JATROPHA L.

Shrubs or herbs. Leaves alternate. Flowers monœcious, staminate and pistillate intermixed in the cymes, apetalous. Calyx large, white, 5-lobed, corolla-like. Stamens numerous, usually monadelphous. Ovary usually 3-celled, 3-seeded; styles 3, united at the base, several-parted.*

1. J. stimulosa Michx. SPURGE NETTLE. Perennial herbs armed with stinging hairs; stems erect, branched, bright green with white lines, 8–15 in. high. Leaves long-petioled, deeply palmately 3–5-lobed, the lobes irregularly cut and toothed, often mottled. Sepals white, spreading. Seeds oblong, smooth, mottled. In dry woods S.*

FIG. 23. *Euphorbia corollata*

A, flower cluster with involucre, the whole appearing like a single flower. *B*, a single staminate flower: *a*, anther. *C*, fertile flower, as seen after the removal of the sterile flowers. *D*, partly matured fruit: *i*, involucre; *s*, stigmas; *c*, capsule

II. EUPHORBIA L.

Herbs or shrubs, with milky juice, often poisonous. Flowers monœcious, inclosed in a 4–5-lobed involucre, which is often showy and resembles a calyx or corolla, usually bearing large

glands at its notches. Sterile flowers many, borne inside the involucre at its base (Fig. 23, *A*), each consisting only of a single stamen attached by a joint to a pedicel which looks like a filament. Fertile flower standing alone at the center of the involucre (Fig. 23, *C*) (soon pushed out by the growth of its pedicel), consisting only of a 3-lobed and 3-celled ovary, 3 2-cleft styles, and 6 stigmas. Pod 3-celled and 3-seeded.

A. *Cultivated shrubs.*

1. E. splendens Bojer. CROWN OF THORNS. An extremely prickly shrub, with many erect, few-leaved branches. Leaves obovate or obovate-spatulate, mucronate, entire, each with two very sharp prickles (longer than the petiole) as stipules. Peduncles long, sticky, each bearing 2–4 objects which appear to be showy scarlet flowers, but which are actually 2-bracted involucres containing the true flowers. Involucral scales somewhat kidney-shaped, mucronate. Flowering all the year round. Cultivated in greenhouses. From Mauritius.

B. *Herbs with rather showy white flower clusters.*

2. E. marginata Pursh. SNOW ON THE MOUNTAIN. Annual. Stem stout, 1–3 ft. high. Leaves sessile, ovate, obovate or oblong, acute, $\frac{3}{4}$–3 in. long, the upper ones whorled and with white petal-like margins. Involucres 5-lobed in an umbel-like inflorescence with three forking rays. In dry soil W. and commonly cultivated.

3. E. corollata L. FLOWERING SPURGE. Perennial. Stem erect, umbellately branched above, smooth or downy, 1–3 ft. high. Leaves of the stem alternate, those of the branches usually opposite or whorled, rather thick, oval to narrowly oblong, pale beneath, usually slightly downy. Flowering branches repeatedly forked; involucres terminal and in the forks of the branches, peduncled; glands 4–5, oblong, green; appendages white and petal-like, showy. Capsule erect, seed smooth or faintly pitted. Common in dry, open woods.

C. *Herbs: No. 4 a native species; No. 5 cultivated from Europe or escaping from gardens. Flower clusters in umbels, not white. Involucre 4- or 5-lobed, each lobe with a gland.*

4. E. dictyosperma Fisch. & Mey. Annual. Stem slender, 8–18 in. high, erect. Stem leaves oblong-spatulate to obovate, serrate; floral ones roundish-ovate, somewhat heart-shaped. Flower cluster a compound umbel, the rays once or twice 3-forked, then 2-forked. Seeds covered with a network. Prairies and roadsides.

5. E. Cyparissias L. Cypress Spurge, Cypress, Graveyard Moss. A perennial, in dense clusters 6–12 in. high, from running rootstocks. Leaves much crowded, all sessile, the stem leaves linear, floral ones broadly heart-shaped. Flower cluster a simple, many-rayed umbel. Glands crescent-shaped. Cemeteries, roadsides, etc., escaped from cultivation; also cultivated in old gardens. From Europe.

55. ANACARDIACEÆ. Sumac Family

Trees or shrubs, with resinous, acrid, or milky sap. Leaves simple, of 3 leaflets or pinnately compound, alternate, without stipules. Flowers bisexual or unisexual, small. Calyx 3–5-parted, persistent. Petals 3–5 or wanting. Stamens as many as the sepals or sometimes twice as many, inserted in the base of the calyx, distinct. Ovary free, 1-celled; styles 1–3. Fruit a 1-seeded drupe.*

RHUS L.

Trees or shrubs. Leaves of 3 leaflets or odd-pinnate. Flowers in spikes or panicles. Calyx mostly 5-parted. Petals and stamens 5. Pistil 1, sessile; styles 3, terminal. Fruit small, smooth or downy.*

1. R. typhina L. Stag-Horn Sumac. A small tree, 20–40 ft. high; branches and petioles closely velvety-hairy. Leaves odd-pinnate, leaflets 17–27, lanceolate-oblong, taper-pointed at the apex, very obtuse at the base, sharply serrate, smooth above, pale and downy beneath. Flowers somewhat monœcious, in dense terminal panicles. Fruit red, with crimson hairs. Dry hillsides N. and E.*

2. R. glabra L. Sumac. A shrub or small tree, sometimes 25–30 ft. high; branches downy. Leaves odd-pinnate, main midrib downy and wing-margined; leaflets 9–21, ovate-lanceolate, acute at the apex, inequilateral, entire or slightly toothed, smooth and green above, pale and downy beneath. Panicle often large and spreading; flowers somewhat monœcious. Fruit red, hairy, acid. Open woods.*

3. R. Vernix L. Poison Sumac, Poison Dogwood. A very smooth shrub with gray bark, 6–18 ft. high. Leaves large and glossy, with 7–13 obovate-oblong, entire leaflets. Flower clusters loosely flowered, axillary panicles. Fruit smooth, greenish-yellow. Swamps and wet openings in woods N. and E. Plant more poisonous than the following species.

4. R. Toxicodendron L. Poison Vine, Poison Ivy, Mercury, Black Mercury. Stem a woody vine climbing high by aërial rootlets, or sometimes short and erect. Leaves petioled, of 3 leaflets, downy; leaflets ovate or oval, taper-pointed, entire or somewhat dentate, often angled or lobed. Flowers diœcious, in loose axillary panicles. Fruit nearly white, smooth. Common in open woods and along fences. Plant poisonous to the touch.*

56. AQUIFOLIACEÆ. Holly Family

Trees or shrubs. Leaves simple, alternate, petioled; stipules small or wanting. Flowers small, greenish, clustered or solitary in the axils, usually diœcious. Calyx 4–9-parted. Petals 4–9, somewhat united at the base. Stamens inserted in the tube of the corolla and alternate with its lobes. Ovary free, 4–9-celled, with a single ovule in each cell. Fruit a berry-like drupe, 4–9-seeded.*

ILEX L.

Small trees or shrubs. Leaves usually leathery, often persistent and evergreen; stipules minute. Flowers axillary, 4–9-parted, the fertile often solitary and the staminate clustered. Fruit a drupe with 4–9 nutlets.*

1. I. opaca Ait. Holly. Trees with smooth, light-colored bark, and hard, very white wood; young twigs downy. Leaves leathery, oval or ovate, margin prickly-toothed, dark green and shining above, paler and sometimes slightly downy beneath. Peduncles short, bracted. Flowers 4-parted; staminate flowers in small cymes, the pistillate ones usually solitary. Fruit bright red. Damp, sandy soil E. and S.*

2. I. decidua Walt. Deciduous Holly. Small trees; twigs smooth. Leaves thin, obovate, obtuse or sometimes acute at the apex, scalloped, smooth, deciduous. Flowers in sessile clusters, 4–6-parted. Fruits very numerous, bright red. On low ground S.*

3. I. verticillata Gray. Black Alder, Winterberry. A much-branched shrub 6–8 ft. high. Leaves thin, oval or obovate, taper-pointed, serrate, 1½–2 in. long. Flowers greenish-white, on very short peduncles. Fruit bright red, 1, 2, or 3 in a leaf axil, remaining long after the leaves have fallen. Swampy ground and damp woods and thickets.

57. CELASTRACEÆ. Wahoo Family

Trees or shrubs, sometimes climbing. Leaves simple, opposite or alternate. Flowers small, in cymes. Calyx small, 4–5-lobed, persistent. Petals 4–6, short. Stamens 4–6, alternate with the petals and inserted with them on a disk. Ovary sessile, 3–5-celled; style entire or 3–5-cleft; ovules 2 in each cell. Seeds usually covered with an appendage (aril) growing from the hilum.

I. EVONYMUS L.

Shrubs with 4-angled branches. Leaves opposite. Flowers in axillary, peduncled cymes, purplish or greenish, small. Sepals and petals 4–5, spreading. Stamens as many as the petals, short. Ovary 3–5-celled, with 2 ovules in each cell. Seeds inclosed in a red, fleshy pulp.*

1. E. atropurpureus Jacq. Wahoo. A tree-like shrub 10–15 ft. high. Leaves oval to ovate, taper-pointed, finely serrulate, minutely downy petioles ½–¾ in. long. Peduncles slender, 3-forked, several-flowered. Flower purplish. Capsule deeply 3–5-lobed, smooth. River banks.

2. E. americanus L. Strawberry Bush. A shrub 3–8 ft. high. Leaves short-petioled, ovate to ovate-lanceolate, acute or taper-pointed at the apex, finely serrulate, smooth or slightly hairy. Peduncles axillary, slender, 1–3-flowered. Flowers greenish. Capsule 3–5-angled, warty. In low, shady woods.

3. E. obovatus Nutt. Running Strawberry Bush. A low shrub, the trailing and rooting branches not usually rising more than 1 or 2 ft. from the ground. Leaves thin, obovate or oblong, mostly tapering to the base. Flowers and fruit nearly as in *E. americanus*. In damp woods.

II. CELASTRUS L.

A woody, twining shrub. Leaves alternate. Flowers diœcious or somewhat monœcious, small, greenish, clustered at the ends of the branches. Pod 3-celled, 3-valved, looking like an orange-colored berry, which on opening shows the scarlet arils of the seeds.

1. C. scandens L. Waxwork, Climbing Bittersweet. Climbing 10–15 ft. Leaves ovate-oblong, 2–4 in. long, finely serrate, taper-pointed. In thickets and along fences; also planted for the showy scarlet seeds, which retain their color for many months.

58. STAPHYLEACEÆ. Bladder Nut Family

Shrubs. Leaves pinnately compound, with stipules, and the leaflets with little individual stipules (stipels). Flowers regular and perfect. Calyx lobes 5. Petals 5, inserted in or around a saucer-shaped disk. Stamens 5, alternate with the petals, perigynous. Ovary 2–3-celled, with the carpels more or less distinct; ovules several; styles 2–3, somewhat united below. Fruit usually 1–few-seeded.

STAPHYLEA L.

Calyx deeply 5-parted, the lobes appearing like separate sepals, erect. Petals spatulate, borne on the rim of the thick disk. Pod large, papery, 3-celled, finally opening at the top. Seeds 1–4 in each cell, bony.

1. S. trifolia L. American Bladder Nut. A shrub 6–12 ft. high, with smooth, slender, greenish-striped, at length gray, branches. Leaves long-petioled, with 3 ovate, taper-pointed, finely serrate leaflets. Damp thickets.

59. ACERACEÆ. Maple Family

Trees or shrubs, with abundant, often sugary sap. Leaves opposite, simple and palmately lobed, or pinnate, without stipules. Flowers regular, mostly somewhat monœcious or diœcious, in axillary and terminal cymes or racemes. Calyx 4–9-parted. Petals as many as the lobes of the calyx or none. Stamens 4–12, hypogynous. Ovary 2-celled; styles 2. Fruit a double key.*

ACER L.

Characteristics of the genus as above given for the family.

1. A. saccharum Marsh. Sugar Maple. A large tree. Leaves simple, palmately lobed, truncate or heart-shaped at the base, lobes sinuate-toothed and acuminate, pale and slightly downy beneath. Flowers appearing with the leaves, on clustered drooping pedicels. Calyx bell-shaped, fringed. Petals none. Keys smooth, wings about

1–1½ in. long. In cold woods, more abundant northward. The sap of this tree is the principal source of maple sugar, and some forms of the tree produce the curled maple and bird's-eye maple used in cabinet making.*

2. A. saccharinum L. White Maple, River Maple. A tall tree with the main branches slender and rather erect. Leaves very deeply 5-lobed, with the notches rather acute, silvery-white, and when young downy on the lower surface, the divisions narrow, coarsely cut and toothed. Flowers greenish, in umbel-like clusters, appearing long before the leaves. Petals absent. Fruit woolly at first, then smooth, with diverging wings, the whole 2–3 in. long. Common on river banks S. and W., also planted for a shade tree, but not safe, as the branches are easily broken off by the wind.

3. A. rubrum L. Red Maple. A small tree with red or purple twigs. Leaves simple, broadly ovate, palmately 3–5-lobed or sometimes merely serrate or cut-toothed, taper-pointed at the apex, rounded or heart-shaped at the base, smooth or downy, becoming bright red in autumn. Flowers appearing before the leaves on erect, clustered pedicels. Petals red or yellow, oblong or linear. Fruiting pedicels elongated and drooping. Key red, smooth, wings about an inch long. Swamps and river banks E.*

4. A. Pseudo-Platanus L. Sycamore Maple. Easily recognized by its drooping clusters of rather large green flowers, which appear with the leaves. Cultivated from Europe.

5. A. platanoides L. Norway Maple. A large tree, with milky sap, which exudes from broken shoots or leafstalks in the spring. Cultivated from Europe; a very desirable shade tree.

6. A. Negundo L. Box Elder. A small tree. Leaves opposite, pinnately 3–5-foliate; leaflets ovate, lobed, toothed or entire, downy when young. Flowers dicœcious, appearing from lateral buds before or with the leaves; the staminate on long and drooping pedicels, the pistillate in drooping racemes. Keys smooth, 1–1½ in. long. River banks. Often cultivated as a quick-growing shade tree.*

60. HIPPOCASTANACEÆ. Buckeye Family

Trees or shrubs. Leaves opposite, long-petioled, palmately compound. Flowers showy, somewhat monœcious, in terminal panicles. Calyx 5-lobed, oblique. Petals 4–5, unequal. Stamens 5–8, hypogynous. Pistil 1; ovary 3-celled, 2 ovules in each cell; style slender. Fruit a 1–3-celled, leathery capsule, 1–3-seeded. Seeds with a large scar.*

ÆSCULUS L.

Characteristics of the genus as above given for the family.

1. Æ. Hippocastanum L. Horse-Chestnut. A round-topped tree with frequently forking branches and stumpy twigs. Leaves very large, with 7 straight-veined leaflets. Flowers large and showy. Corolla open and spreading, of 5 white petals, spotted with purple and yellow. Stamens with long, curved filaments. Fruit large, covered with stout, soft prickles when young. Cultivated from Asia.

2. Æ. glabra Willd. Ohio Buckeye. A large tree, not unlike a horse-chestnut. Leaflets generally 5. Flowers small. Corolla of 4 upright, pale yellow petals. Stamens curved, about twice as long as the petals. Fruit prickly at first. River banks.

3. Æ. octandra Marsh. Sweet Buckeye. Varying in size from a low shrub to a tall tree. Leaves with 5–7 leaflets. Flowers in a short, dense panicle. Petals 4, in 2 unlike pairs, bending inward; blades of the longer pair very small. Fruit not prickly. Woods W. and S.

4. Æ. Pavia L. Red Buckeye. Shrubs. Stems erect, branched, 4–8 ft. high. Leaflets usually 5, lanceolate to narrowly oval, taper-pointed at both ends, finely serrate, smooth or nearly so. Flowers in dense, erect panicles, bright red. Stamens rather longer than the petals. Fruit nearly smooth. Common in open woods.*

61. BALSAMINACEÆ. Balsam Family

Tender, fleshy-stemmed, annual herbs. Leaves simple, without stipules. Flowers bisexual, zygomorphic. Sepals usually 3, the largest one with a spur. Petals 3. Stamens 5, distinct or nearly so. Ovary 5-celled, bursting when ripe into 5 valves.

IMPATIENS L.

Characteristics of the genus those above given for the family. Fruit a capsule (very fleshy in our species), which when ripe bursts open with considerable force, throwing the seeds about.

1. I. pallida Nutt. Wild Balsam, Lady's Slipper. Stem 3–5 ft. high, branching. Leaves oblong-ovate, 2–6 in. long, the lower often long-petioled, the upper nearly sessile. Peduncles axillary, 1–3 in. long, slender, 2–5-flowered. Flowers pale yellow, slightly dotted with brownish-red. Sac of the large sepal broader than it is long, ending in a recurved spur about $\frac{1}{4}$ in. long. Damp, shaded ground, not very common.

2. I. biflora Walt. Wild Balsam, Lady's Slipper, Jewelweed, Snapweed, Kicking Colt. Stem 2–4 ft. high, branching. Leaves rhombic-ovate, 1–4 in. long. Peduncles about 1 in. long, generally 2–3-flowered. Flowers orange color, with many pretty, large, reddish-brown spots. Sac longer than it is broad, ending in a recurved spur about ½ in. long. Damp, shaded ground, commoner than No. 1 and usually blossoming earlier.

62. RHAMNACEÆ. Buckthorn Family

Trees or shrubs. Leaves simple, often 3–5-nerved; stipules small. Flowers small, sometimes unisexual, green or yellow. Calyx 4–5-lobed. Petals 4, 5, or absent, inserted on a disk at the throat of the calyx, very small, hooded, usually with claws. Stamens 4–5, inserted with the petals and opposite them, often inclosed by the petals; filaments awl-shaped; anthers small, versatile. Ovary 3-celled, 3-ovuled.

I. BERCHEMIA Neck.

Shrubs; stems twining or erect. Leaves alternate, prominently pinnate-veined, stipules minute. Flowers in axillary or terminal panicles, or rarely solitary. Calyx tube hemispherical, 5-lobed. Petals 5, sessile, concave, as long as the calyx. Ovary 2-celled, half inferior; stigmas 2. Fruit an oval, 2-seeded drupe.*

1. B. scandens Trel. Supple Jack, Rattan Vine. Woody, often twining high; older bark yellowish, twigs purple, wood very tough. Leaves ovate or oval, acute or obtuse, cuspidate at the apex, rounded at the base, wavy on the margins, green above, pale beneath. Flowers in small panicles. Fruit purple. In moist woods and along streams S.*

II. RHAMNUS L.

Leaves alternate, deciduous. Flowers in small, axillary cymes, often unisexual. Petals 4–5 or wanting. Stamens 4 or 5, very short. Drupe, 2–4-seeded.

1. R. lanceolata Pursh. A tall shrub. Leaves with short petioles, taper-pointed or somewhat obtuse, very variable in size, smooth or nearly so above, more or less downy beneath, finely serrate. Flowers

2 or 3 together in the axils, greenish, about $\frac{1}{8}$ in. in diameter, usually dicœcious, appearing at the same time as the leaves. Calyx 4-lobed. Petals 4. Stamens 4. Fruit black, about $\frac{1}{4}$ in. in diameter. Hills and river banks.

2. R. caroliniana Walt. CAROLINA BUCKTHORN. A small tree with black bark and very hard wood; twigs finely downy. Leaves alternate, prominently veined, elliptical to broadly oval, entire or obscurely serrate, smooth or sometimes downy below; petioles slender, downy. Flowers in axillary, peduncled umbels; petals minute. Fruit globose, $\frac{1}{3}$–$\frac{1}{2}$ in. in diameter, 3-seeded. Seeds smooth. On river banks.*

III. CEANOTHUS L.

Shrubs. Leaves alternate, petioled. Flowers bisexual, in terminal panicles or corymbs formed of little umbel-like clusters. Calyx tube top-shaped or hemispherical, with a 5-lobed border. Petals 5, with hoods, on slender claws. Stamens 5; filaments long and thread-like. Fruit dry, 3-lobed, splitting when ripe into 3 carpels.

1. C. americanus L. NEW JERSEY TEA, RED ROOT. Shrub, with many branching stems, 1–3 ft. high, from a deep red root. Leaves 1–3 in. long, ovate or nearly so, acute or taper-pointed at the tip, obtuse or somewhat heart-shaped at the base, downy beneath, serrate, 3-nerved. Flowers small, white.

2. C. ovatus Desf. SMALLER RED ROOT. Similar to *C. americanus* but usually smaller and nearly smooth. Leaves narrowly oval or elliptical-lanceolate, finely glandular-serrate, $\frac{1}{2}$–2 in. long. Dry rocks and prairies, especially S.W.

63. VITACEÆ. VINE FAMILY

Shrubs, with the stem swollen at the insertion of the petioles and climbing by tendrils borne opposite the leaves. Leaves alternate, with stipules simple or compound. Flowers small, greenish, generally in clusters, borne in similar positions to the tendrils, hypogynous or nearly so. Sepals, petals, and stamens 4–5. Carpels 2, each 2-ovuled. Calyx very small. Corolla deciduous, the petals often hooded. Stamens opposite the petals. A disk inside the calyx bears nectar and its lobes alternate with the stamens. Fruit a berry.

I. PSEDERA Neck. (PARTHENOCISSUS)

Woody vines, climbing by tendrils and rootlets. Leaves palmately compound. Flowers in compound cymes, perfect or somewhat monœcious. Petals 5, distinct, spreading; disk none. Stamens 5. Ovary 2-celled, 4-ovuled. Fruit a 1–4-seeded berry, not edible.*

1. P. quinquefolia Greene. Woodbine, Virginia Creeper. Stem smooth. Leaflets dull green, paler below; tendrils 5–12-branched, most of the branches ending in disks which cling to supporting objects. Flowers panicled, the main branches of the cluster unequal. Fruit hardly fleshy. Thickets, common.

2. P. vitacea Greene. Woodbine, Virginia Creeper. Stem smooth or slightly downy. Leaflets deep green above, not much paler below; tendrils 2–5-branched, the branches usually without disks at the tips. Flower cluster forking regularly, the main branches nearly equal. Fruit more fleshy than in No. 1. Moist woods and thickets in deep, rich soil; common.

3. P. tricuspidata Rehder. Japanese Ivy, Boston Ivy. A freely branching, hardy climber. Tendrils numerous, branching with closely adhesive disks. Leaves occasionally with 3 leaflets, but usually with only one, which is jointed with the main petiole and in autumn falls before the petiole; leaflet 3-lobed or only scalloped, roundish-ovate or heart-shaped, rather thick and shining. Cultivated from Japan.

II. VITIS L.

Climbing woody vines. Stems with enlarged joints, climbing by tendrils opposite some of the leaves. Leaves simple, palmately veined or lobed; stipules small, soon deciduous. Flowers mostly somewhat monœcious or dicœcious. Petals often united at the apex and not expanding. Stamens inserted between the lobes of the disk. Ovary usually 2-celled, 4-ovuled. Fruit juicy, 1–4-seeded.*

1. V. labrusca L. Fox Grape. Stems climbing high, often 1 ft. or more in diameter; bark shreddy, coming off in long strips; young branches woolly. Leaves broadly heart-shaped, more or less deeply 3–5-lobed, mucronate-dentate, very woolly when young, becoming smooth above. Panicles of pistillate flowers compact, of staminate flowers looser. Fruit about $\frac{1}{2}$ in. in diameter, dark purple or sometimes nearly white. In rich woods E., S., and S.W. Many of the cultivated varieties, such as Concord, Niagara, etc., have been developed from this species.*

2. V. æstivalis Michx. Summer Grape. Stem climbing high; bark shreddy. Leaves broadly heart-shaped, 3–5-lobed, the lobes dentate, notches rounded, white-woolly when young, often nearly smooth when old; tendrils or panicles opposite 2 out of every 3 leaves, panicles long and slender. Fruit dark blue, small, very acid. In rich woods E. and S.*

3. V. cinerea Engelm. Downy Grape. Branchlets angular, covered with whitish or grayish down. Leaves entire or slightly 3-lobed, with whitish or grayish down, especially on the under side. Berries small, black, without bloom. S.W.

4. V. cordifolia Michx. Frost Grape, Chicken Grape. Leaves rather smooth, thin, and shining, either not lobed or somewhat 3-lobed, heart-shaped, with the notch at the base deep and acute, taper-pointed, with large, sharp teeth. Flower clusters large and loose. Grapes shining black, very sour, not ripening until after frosts; seeds 1 or 2, rather large. Moist thickets and banks of streams S.

5. V. vulpina L. Riverside or Sweet-Scented Grape. Resembling *V. cordifolia*, but the leaves more shining and more commonly 3-lobed. Fruit bluish-black, with a bloom, moderately sweet, $\frac{1}{3}$ in. or more in diameter, beginning to ripen in July. Along ponds and streams, especially W. and S.W.

6. V. rotundifolia Michx. Muscadine Grape. Stem climbing high; joints short; bark not shreddy; wood very hard, often producing long, aërial roots. Leaves orbicular, heart-shaped at the base, coarsely toothed, nearly or quite smooth. Panicle small. Grapes few in a cluster, large. The original form of the Scuppernong grape. S.*

64. TILIACEÆ. Linden Family

Trees or shrubs, rarely herbs. Leaves alternate, with stipules. Flowers bisexual in cymes, the latter usually in corymbs or panicles. Sepals 5. Petals 5 or fewer, or wanting. Stamens many, inserted on a swollen disk. Ovary 2–10-celled, with one or more ovules in each cell. Fruit 1–12-celled, dry or berry-like.

TILIA L.

Trees with rough gray bark on the trunk; bark of the twigs smooth, lead-colored; wood white and soft. Leaves cordate, usually inequilateral. Cymes axillary or terminal, peduncles adnate to a large, prominently veined, leaf-like bract. Flowers yellowish-white. Sepals 5. Petals 5. Stamens many, in 5

groups. Ovary 5-celled, with 2 ovules in each cell; stigma 5-lobed. Capsule 1-celled, 1–2-seeded; peduncle and bract deciduous with the matured fruit, the bract forming a wing by which the fruit is often carried to a considerable distance.*

1. T. americana L. Basswood, Whitewood. A large tree, sometimes 125 ft. high. Leaves larger than in No. 2 (2–5 in. wide), often unsymmetrical, heart-shaped or truncate at the base, sharply toothed. Floral bract often narrowed at the base. Fruit somewhat ovoid, $\frac{1}{3}$ in. or more in diameter. Common in rich woods; occurs farther N. than No. 2.

2. T. Michauxii Nutt. Basswood. A tree of medium size. Leaves ovate, acuminate at the apex, obtuse and oblique at the base, mucronate-serrate, woolly on both sides or smooth above when old. Flowers fragrant; floral bract 2–3 in. long, usually rounded at the base. Fruit globose, about $\frac{1}{4}$ in. in diameter. In rich woods. Bees gather large quantities of nectar from the flowers.*

3. T. heterophylla Vent. White Basswood. A large tree. Leaves larger than in *T. americana* or *T. Michauxii*, often 6–8 in. long, smooth and bright green above, silvery-downy underneath. In wooded or mountainous districts.

4. T. europæa L. European Linden. A good-sized tree. Leaves roundish, obliquely heart-shaped, abruptly taper-pointed, finely toothed. Flowers differing from Nos. 1 and 2 in the absence of petal-like scales at the bases of the stamens. Cultivated from Europe.

65. MALVACEÆ. Mallow Family

Herbs or shrubs, with simple, alternate, palmately-veined leaves, with stipules. Flowers actinomorphic. Sepals 5, often surrounded by an involucre at the base. Petals 5. Stamens numerous, monadelphous. Pistils several, more or less distinct. Fruit a several-celled capsule or a collection of 1-seeded carpels.

I. ABUTILON Adans.

Calyx 5-cleft, the tube often angled. Styles 5–20, with knobbed stigmas. Carpels as many as the styles, arranged in a circle, each 1-celled, 3–6-seeded, and opening when ripe by 2 valves.

1. A. striatum Dicks. Tassel Tree, Flowering Maple. A shrub 5–10 ft. high. Leaves maple-like. Flowers showy, solitary,

nodding on slender peduncles. Corolla not opening widely, orange, striped with reddish-brown veins. Column of stamens projecting beyond the corolla like a tassel. Cultivated in hothouses. From Brazil.

II. MALVASTRUM Gray

Calyx with an involucel of 2 or 3 bractlets or none. Petals notched at the end or entire. Styles 5 or more, with knobbed stigmas. Carpels not splitting open or somewhat 2-valved, falling from the axis when mature, tipped with a point or beak.

1. M. coccineum Gray. Red False Mallow. Perennial, 4–10 in. high, covered with a dense silvery down of star-shaped hairs. Leaves 3–5-parted. Flowers in short spikes or racemes. Petals red, much longer than the calyx. Carpels 10 or more, with a wrinkled network on the sides. Prairies W. and S.W.

III. MALVA L.

Calyx 5-cleft, with a small, 3-leaved involucel. Petals obcordate or truncate. Styles many, slender, with stigmas running down the sides. Carpels many, 1-seeded, arranged in a circle and separating from each other, but not opening when ripe.

1. M. rotundifolia L. Common Mallow, Cheeses (from appearance of the unripe fruit). A common biennial or perennial weed, with nearly prostrate stems. Leaves long-petioled, round-kidney-shaped, with crenate margins. Flowers small, whitish, on long peduncles.

2. M. sylvestris L. High Mallow. Biennial or perennial. Stem erect, 2–3 ft. high. Leaves 5–7-lobed. Flowers purplish, larger than those of the preceding species.

IV. CALLIRHOË Nutt.

Calyx naked, or with a 3-leaved involucel at the base. Petals wedge-shaped, often toothed and fringed. Styles and stigmas as in *Malva*. Carpels 10–20, joined in a circle, 1-seeded, beaked at the tip.

1. C. alcæoides Gray. Light Poppy Mallow. Perennial. Stems rather slender, 8–20 in. high, covered with close-lying stiff hairs. Basal leaves triangular-heart-shaped, palmately lobed or incised;

stem leaves palmately divided. Involucel none. Flowers pink or white, about 1 in. in diameter. Carpels strongly wrinkled. In dry soil W. and S.W.

2. C. digitata Nutt. Fringed Poppy Mallow. Resembling *C. alcæoides*. Flowers 1½–2 in. in diameter. Petals reddish-purple to white, fringed. In dry soil S.W.

3. C. involucrata Gray. Purple Poppy Mallow. Perennial. Stems 1–2 ft. high, procumbent or ascending. Leaves round-heart-shaped, palmately lobed or cut. Involucel 3-leaved. Peduncles long, slender, and 1-flowered. Flowers reddish-purple, 1–2½ in. in diameter. Carpels with a wrinkled network. In dry soil W. and S.W.

66. HYPERICACEÆ. St. John's-wort Family

Herbs, shrubs, or trees. Leaves opposite, often covered with translucent or dark dots, entire or with glandular teeth, without stipules. Flowers usually in terminal cymes. Sepals 5, rarely 4. Petals as many as the sepals, hypogynous. Stamens usually many, more or less grouped in bundles; anthers versatile. Pod 1-celled, with 2–5 parietal placentæ and the same number of styles, or else 3–7-celled, splitting along the partitions.

HYPERICUM L.

Herbs, shrubs, or small trees. Leaves sessile, often dotted. Flowers yellow, bisexual.

B. Fl. species 2 (*Sarothra*).

1. H. perforatum L. Common St. John's-wort. Perennial. Stem erect, 1–3 ft. high, 2-ridged, much branched. Leaves linear or oblong, obtuse, with translucent veins and dots. Cymes grouped in corymbs, many-flowered. Flowers 1 in. in diameter. Sepals acute. Petals much longer than the sepals, oblique at the tip and irregularly fringed. A common weed in meadows and pastures E. and N. Naturalized from Europe.

2. H. gentianoides BSP. Orange Grass, Pineweed. Low (4–9 in. high), slender annual, with erect, angled or almost winged, wiry stem and branches. Leaves minute awl-shaped scales. Corolla about ¼ in. in diameter, usually closing by or before midday. Sandy banks and roadsides.

67. VIOLACEÆ. Violet Family

Herbs, with simple, alternate leaves, with stipules. Calyx of 5 persistent sepals. Corolla of 5 petals, somewhat zygomorphic; one petal with a spur. Stamens 5, short, the filaments often united around the pistil (Fig. 24). Style generally club-shaped, with a one-sided stigma, with an opening leading to its interior. Pod 1-celled, splitting into 3 valves, each bearing a placenta. The seeds are often dispersed by the splitting of the elastic valves (Fig. 24).

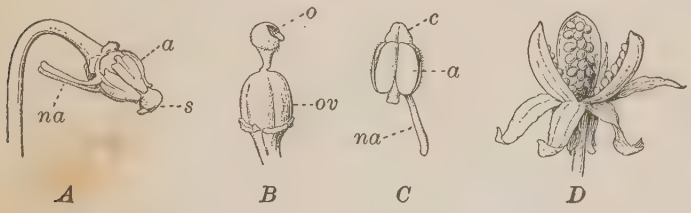


Fig. 24. *Viola tricolor*

A, stamens and pistil; *B*, pistil with stamens removed; *C*, stamen; *D*, pod split open. *a*, anther; *c*, connective; *na*, nectarial appendage of stamen; *o*, orifice in stigma; *ov*, ovary; *s*, stigma. (*A*, *B*, and *C* considerably magnified)

VIOLA L.

Sepals ear-like at the base. Some of the petals often bearded within, thus affording a foothold for bees, the lowest one with a spur at the base. Stamens not very much united, the two lowermost with spurs which reach down into the spur of the lowest petal. Many species bear inconspicuous apetalous flowers later than the showy ordinary ones, and produce most of their seed from these closed, self-fertilized flowers.

§ 1. *Apparently stemless perennials*

1. V. pedata L. Bird-Foot Violet, Horseshoe Violet, Sand Violet. Rootstock stout, upright, not scaly. Leaves roundish, all palmately 5–9-parted into linear or linear-lanceolate divisions. Flowers showy, about 1 in. broad, pale violet to whitish; petals not bearded. Dry fields and hillsides.

2 V **cucullata** Ait. Marsh Blue Violet. Leaves acute, except the earliest ones. Petal-bearing flowers violet blue, with a darker center; peduncles usually longer than the leaves, the spur-bearing petal smooth. Stipules ovate to lanceolate, with long ear-like appendages. Cleistogamous flowers borne on erect or ascending peduncles. Capsule and seeds longer than the sepals. Wet ground, common.

3 V **papilionacea** Pursh. Common Blue Violet. Dooryard Violet. Petals usually strong and vigorous from a thick horizontal rootstock, usually smooth. Leaves bright green, cordate at the base, sometimes triangular or rounded and pointed. Stipules at the time of flowering longer than the leaves. Petals dark violet purple, white or greenish yellow at the base. Spur with a spur often narrow and knob-shaped. Capsules from the cleistogamous flowers borne on horizontal peduncles and often underground, but rising as they mature. Very common about dwellings and gardens.

4 V **palmata** L. Early Blue Violet. Usually downy. Petioles much longer than the blades; leaves, except the earliest ones, cordate-ovate to ovate, sometimes toothed on their segments, the petioles and the veins of the under surface very hairy. Stipules usually longer than the leaves. Sepals lanceolate, acute to somewhat pointed. Petals violet-purple, occasionally pale. Cleistogamous flowers borne on horizontal or deflexed peduncles. In dry, rich woodlands.

5 V **sororia** Willd. Woolly Blue Violet. In size and appearance much like No. 4. Leaves roundish, nearly ovate or roundish-ovate, pointed, cordate at the base, roundish, densely soft-hairy when young. Petals bluish, pinkish, varying from violet to lavender. Cleistogamous flowers on short prostrate peduncles. Moist meadows and rich woods.

6 V. **fimbriatula** Sm. Downy-leaved Violet. Rootstock usually thick, at length long and stout. Petioles generally shorter than the blades, hairy. Leaves ovate-lanceolate to oblong, usually slightly crenate-toothed or entire, cordate at the base. Petals blue, bearded. Capsules of the cleistogamous flowers borne on erect peduncles. In dry woods.

§ 2. *Leafy-stemmed perennials*

7 V **pubescens** Ait. Downy Yellow Violet. Soft-downy, 6–12 in. high. Stem leaves ovate-kidney-shaped, soon withering; stem leaves broadly heart-shaped, toothed, pointed, with large stipules. Flowers yellow, somewhat purplish-veined, with a short spur. In dry woods, common.

8 V **scabriuscula** Schwein. Smooth Yellow Violet. Like V. pubescens, but smaller, smoother, and less downy. Stems decumbent or ascending. Basal leaves broadly ovate, usually persistent through

the flowering period. Flowers pale yellow, purple-veined. In moist woods and thickets.

9. V. canadensis L. CANADA VIOLET. Stems tufted, very leafy, smooth, 1 ft. or more high. Leaves heart-shaped, acute or taper-pointed, serrate; stipules lanceolate, entire. Flowers large and handsome. Petals white or nearly so, inside, the upper ones usually violet-tinged beneath; lateral petals bearded. In rich woods, especially of hilly regions.

10. V. striata Ait. STRIPED VIOLET. Similar to *V. canadensis*, but the stipules dentate, pinnately cut, or fringed. Petals cream-colored, white, or bluish, distinctly veined. Moist woods and thickets.

§ 3. *Leafy-stemmed, from an annual, biennial, or occasionally short-lived perennial root; stipules about as large as the blades of the leaves.*

11. V. tricolor L. PANSY, HEART'S-EASE. Stem branching, angular, hardly erect. Leaves variable, more or less ovate, crenate or crenate-serrate. Flowers large (often more than 1 in. across), flattish, short-spurred, exceedingly variable in color. Cultivated from Europe.

12. V. arvensis Murr. FIELD PANSY. Similar to *V. tricolor*, but the whole plant smaller and more slender. Leaves narrow, often lanceolate, the stipules dissected into narrow divisions. Petals all yellow, equaling or shorter than the slender, pointed sepals. Common in old fields. Naturalized from Europe.

13. V. Rafinesquii Greene. WILD PANSY. Annual, slender, often branching from the base. Leaves small, the earlier ones roundish, on slender petioles; the later ones obovate or narrower, tapering to the base. Flowers small, yellowish-white to bluish-white. Petals much longer than the linear sepals. Woods and fields.

68. PASSIFLORACEÆ. PASSION FLOWER FAMILY

Shrubs or herbs, climbing by axillary tendrils. Leaves alternate, simple, mostly 3-lobed. Flowers axillary, on jointed peduncles, solitary or few together, bisexual, actinomorphic, often showy. Calyx tube 4–5-lobed, persistent. Petals usually 5, inserted on the throat of the calyx tube, which is fringed with a crown of 1–3 rows of long and slender filaments. Stamens 5, their filaments united, and inclosing the stalk of the ovary. Styles 1–5; ovary with 3–5 parietal placentæ. Seeds numerous; fruit fleshy.

PASSIFLORA L.

Characters of the family.

1. P. incarnata L. Passion Flower. Perennial. Stem often 20–30 ft. long, somewhat angled or striate, smooth below, downy above. Leaves broadly heart-shaped, palmately 3–5-lobed; the lobes acute, finely serrate, usually heart-shaped at the base; petiole bearing 2 oval glands near its summit. Flowers 2–3 in. wide, solitary; peduncles 3-bracted, longer than the petioles; calyx lobes with a small horn-like appendage on the back near the apex, white within. Petals and crown purple and white. Fruit yellow, about the size and shape of a hen's egg, edible. Seeds with a pulpy aril. Common along fence rows and embankments S.*

2. P. lutea L. Yellow Passion Flower. Perennial. Stem slender, smooth, 6–10 ft. long. Leaves broadly heart-shaped, 3-lobed at the summit, entire, often mucronate; stipules small; petioles without glands. Peduncles longer than the leaves, usually in pairs. Flowers greenish-yellow, ½–¾ in. wide. Fruit purple, oval, ½ in. long. Woods and thickets S.*

69. BEGONIACEÆ. Begonia Family

Chiefly perennial herbs or low shrubs, with fleshy or very juicy stems. Leaves alternate, generally heart-shaped at the base, often very unsymmetrical; stipules deciduous. Flowers monœcious, in cymes or other clusters, on axillary peduncles. Stamens many (Fig. 25). Pistillate flowers with the floral envelopes borne on the ovary. Ovary 3-angled or 3-winged (Fig. 25), very many-seeded.

BEGONIA L.

Flowers with the calyx and corolla of the same color, staminate and pistillate ones both occurring in the same cluster. Sepals usually 2. Petals 2 or in the fertile flowers 3 or 4, sometimes wanting. Stamens many in a cluster, with short filaments. Styles of the fertile flowers 3, often with long, twisted stigmas (Fig. 25, *C*). The genus contains a great number of species and varieties, cultivated from tropical or subtropical regions, of which only a few of the commonest are here described.

1. B. Rex Putz. Herb, apparently stemless or nearly so, from a fleshy rootstock. Leaves large, taper-pointed, very unequally heart-shaped; the margin sinuous, often bristly-fringed; upper surface wholly silvery, or mottled silvery and dark green; lower surface green or reddish, or of both colors. Flowers few, large ($1\frac{1}{2}$–$1\frac{3}{4}$ in. in diameter), varying from yellow to pinkish. Cultivated from the Himalayas. Many varieties.

2. B. manicata Brongn. Herb, with a short and fleshy stem. Leaves very unevenly heart-shaped, taper-pointed; the margins bristly-fringed and sometimes with very remote teeth; upper surface dark green, lower surface and petioles partly covered with long fringed scales; stipules larger and fringed. Flowers flesh-colored, handsome, in a loose panicle borne on a long peduncle. Cultivated from Mexico.

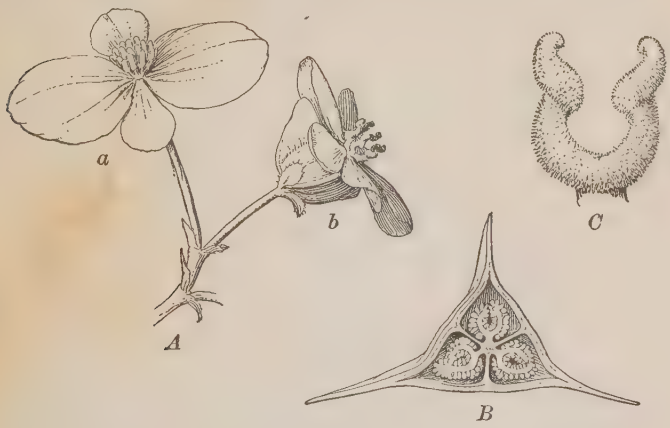


FIG. 25. Begonia flowers

A: *a*, staminate flower; *b*, pistillate flower. *B*, cross section of ovary; *C*, twisted stigmas, enlarged

3. B. coccinea Hook. Tall, 3–10 ft. high, somewhat shrubby, often with many erect, smooth stems from the same root. Leaves broadly and unevenly lanceolate or ovate-lanceolate, half heart-shaped or broadly one-eared at the base, acute, nearly or quite entire, smooth, dull green above, sometimes tinged with red below. Peduncles several–many-flowered, reddish, slender, somewhat nodding. Flowers showy, medium-sized, scarlet. Fruit showy, scarlet, very broadly winged. Cultivated from Peru. [Often called *B. rubra*.]

4. B. incarnata L. & O. Herbaceous or mainly so, rather tall (2–4 ft.), stems clustered, slightly reclining, hairy when young, at length smoother. Leaves broadly and very unequally ovate-lanceolate, tapering toward the tip but at the extremity somewhat blunt, half heart-shaped at the base, somewhat lobed and sinuate-toothed, rough-hairy above and below and on the petioles, dark green above with coppery streaks along the veins. Flowers on short peduncles, few, of medium size; beautiful rose-pink in the bud, becoming almost white; thickly covered outside with soft, moss-like hairs. Cultivated from Mexico. [Often called *B. metallica.*]

5. B. semperflorens L. & O. Stems smooth, herbaceous, rather fleshy, branching near the ground and reclining. Leaves obtuse or nearly so, broadly ovate, somewhat unevenly heart-shaped or tapering at the base, irregularly serrate or scalloped and wavy, smooth, dark green, and very glossy above; stipules rather large, nearly ovate. Flowers in small, axillary clusters near the top of the stem; whitish to crimson, about 1½ in. in diameter. Ovary in fruit very broadly winged. An easily grown but homely species. Cultivated from S. Brazil.

70. CACTACEÆ. Cactus Family

Plants usually with very fleshy and much thickened, often globular or cylindrical, stems. Leaves usually wanting. Flowers sessile, solitary, often very showy. Perianth epigynous, consisting of several rows of sepals and petals. Stamens many, with slender filaments, borne on the inside of the perianth tube. Style 1; stigmas numerous; ovary 1-celled, many-ovuled. Fruit a many-seeded berry.

I. OPUNTIA L.

Stem composed of a series of flattened joints, which are usually leafless when full grown. Leaves very small, awl-shaped, spirally arranged, appearing on the young joints but soon dropping off, with barbed bristles and sometimes spines in their axils. Flowers yellow. Sepals and petals not much united into a tube. Fruit often eatable.

1. O. vulgaris Mill. Common Prickly Pear. Prostrate or nearly so, pale green. Leaves about ⅙ in. long, rather scale-like; bristles many, with few or no spines. Flowers 2 in. or more in diameter,

with about 8 petals. Fruit about 1 in. long, crimson when ripe, eatable. Dry rocks and sandy ground, from Massachusetts south along the coast.

2. **O. Rafinesquii** Engelm. Prostrate, green. Leaves $\frac{1}{4}$–$\frac{1}{3}$ in. long, awl-shaped, spreading; bristles often intermixed with a few small spines and a larger one $\frac{3}{4}$–1 in. long. Flowers larger than in No. 1 and with 10–12 petals. Fruit about $1\frac{1}{2}$ in. long, much tapered at the base. In poor soil.

3. **O. polyacantha** Haw. Prostrate, light green. Leaves very small, with bristles and 5–10 spines in their axils. Flowers 2–3 in. in diameter. Fruit dry and spiny. Wisconsin, S. and W.

II. PHYLLOCACTUS Link.

Stems cylindrical when old, with long, flattened, fleshy but leaf-like, sinuate or serrate branches. Flowers nearly or quite regular, from the notches in the margins of the joints.

1. **P. Ackermanni** Solm. D. Flowers very showy, bright red. Perianth tube shorter than the petals. Sepals scattered, small and bract-like. Petals many, 2–3 in. long, widely spreading, somewhat channeled, sharp-pointed. Cultivated from Mexico.

III. CEREUS L.

Stem more or less prismatic but strongly ridged, with bundles of spines borne on the ridges; sometimes prostrate or trailing, sometimes erect, columnar, and 50 or 60 ft. high. Flowers usually showy, borne on the sides of the stem, generally with a rather long perianth tube, which is covered outside with scale-like sepals, usually with tufts of wool in their axils. Petals many, mostly long and spreading.

1. **C. speciosus** K. Sch. Stems 2–3 ft. high, with 3–4 broad-winged and sinuate ridges. Flowers open in the daytime and lasting several days, red or crimson, very showy. Petals longer than the tube, stamens white, drooping, very numerous. Commonly cultivated from Mexico.

2. **C. grandiflorus** Mill. Night-Blooming Cereus. Stems long, climbing by aërial roots, nearly cylindrical, but with 5 or more blunt angles. Flowers very showy, opening only for one night, wilting early in the morning, extremely fragrant. Sepals dull yellow. Petals pearly white, spreading, 6–8 in. long. Cultivated from Mexico.

71. ONAGRACEÆ. Evening Primrose Family

Herbs, rarely shrubs or trees. Leaves opposite or alternate, without stipules. Flowers actinomorphic. Limb of the calyx epigynous, 2–4-lobed. Petals 2–4, rarely wanting, quickly falling off. Stamens 1–8. Ovary usually 4-celled; style thread-like; stigma entire or 4-lobed; ovules 1 or more in the inner angle of each cell. Fruit a capsule, berry, or drupe. Seeds 1 or more, smooth or hairy.

I. ŒNOTHERA L.

Herbs, rarely shrubby. Leaves alternate. Flowers large, yellow, red, or purple. Calyx tube 4-angled. Petals 4. Stamens 8. Capsule usually 4-celled, many-seeded.

B. Fl. species 1 (*Onagra*); species 2, 3 (*Kneiffia*); species 4 (*Hartmannia*); species 5 (*Megapterium*).

1. Œ. biennis L. Common Evening Primrose. Annual or biennial. Erect and usually stout, 1–5 ft. high, stem usually simple, more or less downy and hairy. Leaves lanceolate, acute or taper-pointed, sessile or the lower ones petioled. Flowers bright yellow, 1–2 in. in diameter, opening in the evening. Pod oblong, narrowed above, erect, nearly cylindrical. In dry soil.

2. Œ. pumila L. Small Sundrops. Perennial. Stem erect, finely downy, 4–24 in. high. Leaves usually smooth, entire, obtuse or nearly so, the basal ones spatulate, those of the stem varying from oblanceolate to lanceolate. Spikes loose, nodding when young. Flowers $\frac{1}{3}$–1 in. in diameter. Pods slightly glandular-downy, club-shaped, $\frac{1}{4}$–$\frac{1}{2}$ in. long. In dry soil.

3. Œ. fruticosa L. Sundrops. Biennial or perennial. Stem erect, often rather stout, 1–3 ft. high, downy or sometimes smooth. Leaves lance-oblong, or in one variety linear or nearly so, usually minutely toothed. Racemes often corymbed. Flowers open in the daytime, showy, yellow, 1–2 in. in diameter. Pod nearly sessile, ellipsoidal, with prominent ribs and strong wings. Dry soil, common.

4. Œ. speciosa Nutt. Showy Primrose. Perennial. Stem downy, erect or somewhat decumbent, 6 in.–3 ft. high. Leaves broadly lanceolate to linear, sinuate-denticulate or sinuate-pinnatifid, 2–3 in. long. Flowers opening in the daytime, few, $1\frac{1}{2}$–$3\frac{1}{2}$ in. in diameter, white to pale pink. Pod strongly 8-ribbed. Prairies S.W.

5. Œ. missouriensis Sims. Perennial. Stems low, decumbent, with short, silky down. Leaves thick, from oval to linear, usually lanceolate, narrowed to a slender petiole, 2–6 in. long, entire or remotely toothed. Flowers axillary, yellow, 3–6 in. in diameter. Capsule orbicular, with broad wings. In dry soil S.W.

II. FUCHSIA L.

Herbs, shrubs, or trees. Leaves opposite or 3 in a whorl. Flowers showy. Calyx colored, tubular-funnel-shaped, the tube extending much beyond the ovary, the margin 4-lobed. Petals 4, borne in the throat of the calyx. Stamens 8, projecting outside the corolla. Capsule berry-like, ellipsoidal, 4-angled.

1. F. macrostemma R. & P. Common Fuchsia, Ladies' Eardrops. Smooth. Leaves slender-petioled, toothed. Flowers on long, drooping peduncles from the axils of the leaves. Calyx tube oblong or a short cylinder, not as long as its spreading lobes. Petals obovate and notched, wrapped spirally around the projecting filaments and style. Found in many varieties, sometimes the calyx white or nearly so and the petals dark or with dark calyx and light petals. Cultivated from Chile.

III. CIRCÆA L.

Slender, erect herbs, with creeping rootstocks. Stem simple. Leaves opposite, petioled. Flowers small, in terminal and lateral racemes. Calyx tube ovoid, the limb 2-parted, reflexed, deciduous. Petals 2, inversely heart-shaped, inserted with the 2 stamens under the margin of a disk which is borne on the pistil. Ovary 1–2-celled; style thread-like; stigma knobbed, 2-lobed; ovules, 1 in each cell. Fruit ovoid, not splitting open, covered with hooked bristles.

1. C. lutetiana L. Enchanter's Nightshade. Stem 1–2 ft. high, glandular-downy. Leaves ovate, faintly toothed, long-petioled. Flowers $\frac{1}{8}$ in. in diameter, white or pink, on slender pedicels, jointed at the base. Damp, shaded places; very common.

72. ARALIACEÆ. Ginseng Family

Herbs, shrubs, or trees. Leaves alternate, simple or compound; stipules united to the petiole or wanting. Flowers regular, in umbels or heads. Limb of the calyx epigynous,

very short. Petals 5, very deciduous. Stamens 5, filaments bent inward, anthers versatile. Ovary 2-celled or several-celled; styles or stigmas as many as the cells; ovules 1 in each cell. Fruit a drupe or berry. [The English ivy, an important member of the family, flowers too late for school study.]

ARALIA L.

Perennial plants, with pungent or spicy roots, bark, and fruit. Leaves once or more compound. Flowers more or less monœcious, white or greenish, in umbels. Drupe, berry-like.

1. **A. hispida** Vent. Bristly Sarsaparilla, Wild Elder. Stem 1–2 ft. high, rather shrubby below, with prickly bristles. Leaves once or twice pinnate; leaflets ovate, acute, cut-serrate, and often lobed. Peduncle bearing several umbels of cream-colored flowers, in a terminal corymb. Fruit blue-black. Dry fields and pastures E.

2. **A. nudicaulis** L. Wild Sarsaparilla. Perennial herb. Roots very long, somewhat fleshy, aromatic; stem very short or none. Leaf solitary, from a sheathing base, petioled, 6–12 in. long; compound in threes, each division 3–5-pinnate; leaflets oval or ovate, taper-pointed, finely and sharply serrate, smooth above, often downy below. Scape nearly as long as the petiole, usually bearing 3 short, peduncled umbels. Flowers greenish. Styles distinct. Fruit globose, black. In rich woods.

73. UMBELLIFERÆ. Parsley Family

Herbs, usually with hollow, grooved stems. Flowers small, generally in umbels. Limb of the calyx either wanting or present only as a 5-toothed rim or margin around the top of the ovary. Petals 5. Stamens 5, inserted on the disk, which is borne by the ovary (Fig. 26). Ovary 2-celled and 2-ovuled (Fig. 26), ripening into 2 akene-like carpels, which separate from each other. Each carpel bears 5 longitudinal ribs, in the furrows between which secondary ribs frequently occur. On a cross section of the fruit oil tubes are seen, traversing the interspaces between the ribs, and near the surface of the fruit (Fig. 26, *D*). The seeds contain a small embryo, inclosed in considerable endosperm. [The family is a difficult one,

since the flowers are so much alike that the species are distinguished from each other mainly by minute characteristics of the fruit.]

I. ERYNGIUM L.

Annual, biennial, or perennial herbs. Stems erect or creeping. Leaves simple, mostly linear and spiny-toothed. Flowers white or blue, in dense, bracted heads or spikes, flowers bracteolate. Calyx teeth rigid, persistent. Petals erect, pointed. Styles slender. Fruit top-shaped, scaly or granular; ribs wanting; oil tubes usually 5, minute.*

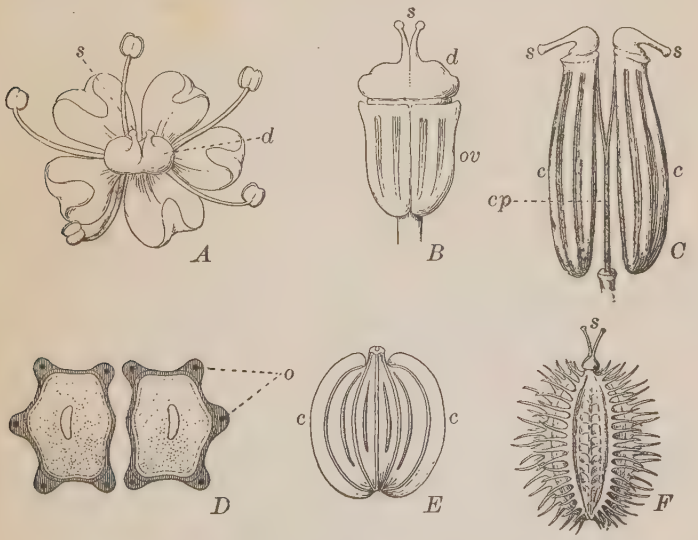


FIG. 26. Flower and fruit of *Umbelliferæ*

A–D, Carum Carvi: A, flower; *B*, partly matured pistil; *C*, mature fruit; *D*, cross section of fruit. *E*, fruit of parsnip; *F*, fruit of carrot. *c*, carpels; *cp*, carpophore, or stalk to which ripe carpels are attached; *d*, disk; *o*, oil tubes; *ov*, ovary; *s*, stigmas. (*A–D*, after Schnizlein; *E*, after Bischoff)

1. **E. yuccifolium** Michx. BUTTON SNAKEROOT, RATTLESNAKE MASTER. Perennial. Stem erect, branched above, striate, covered with a bloom, 2–3 ft. high. Leaves linear, often 2 ft. or more in

length, rigid, covered with a bloom, parallel-veined, fringed with white bristles. Bracts shorter than the heads, entire; bractlets similar but smaller. Flowers white. Fruit scaly. In damp soil.*

II. SANICULA L.

Slender, erect, perennial herbs. Rootstock short, stout, creeping. Leaves palmately cut. Umbels small, somewhat globular, irregularly compound; bracts leafy; bractlets few; flowers bisexual or staminate, greenish or yellowish. Calyx teeth as long as the small petals, sharp-pointed. Fruit ovoid, covered with hooked prickles, ribless, each carpel with 5 oil tubes.

1. S. marilandica L. Sanicle, Black Snakeroot. Perennial. Stem rather stout, 1–4 ft. high. Leaves 3–7-parted, the divisions irregularly serrate or dentate and often cut. Flowers bisexual and staminate, the latter in separate heads. Petals greenish-white, very small. Styles slender, recurved, and longer than the prickles of the fruit. Rich woods.

2. S. gregaria Bicknell. Clustered Snakeroot. Stems generally clustered, 1–3 ft. high. Leaves 5-divided, obovate-wedge-shaped to lanceolate. Some of the staminate flowers in separate heads. Petals yellow, much longer than the calyx. Styles longer than the prickles of the fruit. Woods and thickets.

3. S. canadensis L. Short-Styled Snakeroot. Leaves petioled, 3–5-divided. Staminate flowers never in separate heads. Styles shorter than the prickles of the fruit. In woodlands.

III. ERIGENIA Nutt.

A little smooth plant, with a slender, unbranched stem, from a deep, nearly globular tuber. Leaves 1 or 2, twice or thrice compound in threes. Flowers few, small, in an imperfect leafy-bracted umbel. Calyx teeth wanting. Petals obovate or spatulate. Fruit smooth, roundish, notched at both ends, the two carpels touching only at top and bottom, each with 5 slender ribs.

1. E. bulbosa Nutt. Harbinger of Spring, Turkey Pea, Pepper-and-Salt. Stem scape-like, with a leaf which forms an involucre to the flower cluster. Petals white, anthers brown-purple. A pretty, though inconspicuous plant; welcomed as one of the earliest spring flowers S.

IV. OSMORHIZA Raf. (WASHINGTONIA)

Perennials, springing from stout, aromatic roots. Leaves compound in threes. Flowers white, in compound umbels. Calyx teeth wanting. Fruit linear or nearly so, tapering at the base, with 5 equal bristly ribs, without oil tubes.

1. **O. Claytoni** Clarke. HAIRY SWEET CICELY. Rather stout and hairy, especially when young, 1½–3 ft. high. Lower leaves on long petioles, large, twice compound in threes, the divisions ovate or oval, cut-toothed; upper leaves nearly sessile, less compound. Umbels with long peduncles and spreading rays. Style and its enlarged base somewhat conical. Root nauseous. Rich woods.

2. **O. longistylis** DC. SMOOTH-LEAVED SWEET CICELY. Much like No. 1 in general appearance. Smooth or nearly so. Style rather thread-like. Root of a pleasant aromatic flavor (as is also the fruit). Woods.

Caution. So many plants of this family have actively poisonous roots and foliage that it is unsafe for any one but a botanist, who can distinguish the poisonous species from the harmless ones, to taste them.

V. CARUM L.

Herbs, with slender, smooth stems. Leaves pinnately compound, smooth. Umbels compound. Flowers white or yellowish. Calyx teeth minute. Fruit smooth, oblong or ovate, with thread-like ribs; oil tube single in the intervals between the ribs; base of the styles thickened into a conical mass.

1. **C. Carvi** L. CARAWAY. Perennial. Leaves large, with the leaflets cut into numerous thread-like divisions. Flowers white. Fruit aromatic, used somewhat in this country and more in N. Europe for flavoring cookies, bread, etc. Introduced from Europe.

VI. ZIZIA Koch.

Smooth perennials. Leaves generally as in *Thaspium*. Involucre wanting; involucels of small bractlets. Umbels compound. Flowers yellow. Calyx teeth prominent. Fruit more or less ovoid, smooth, with thread-like ribs: oil tubes large and solitary between the ribs, and a little one in each rib; the central fruit of each umbellet sessile.

1. Z. aurea Koch. Meadow Parsnip, Golden Alexanders. Smooth, stem erect, 1–2 ft. high. Basal leaves mostly heart-shaped and serrate; stem leaves usually once compound in threes. Flowers deep yellow. Fruit between globose and ovoid, about $\frac{1}{6}$ in. long; all the ribs generally winged. Woods and thickets.

VII. THASPIUM Nutt.

Perennial herbs. Stem erect. Leaves 1–2, compound in threes. Umbels compound; involucre and involucels usually wanting. Flowers yellow or purple. Calyx teeth small, acute. Fruit ovoid or oblong, somewhat laterally compressed; carpels smooth, strongly ribbed; oil tubes between the ribs.*

1. T. barbinode Nutt. Hairy Meadow Parsnip. Stem erect, branching above, downy at the nodes, 2–7 ft. high. Leaves petioled, slightly downy; leaflets mostly thin, ovate, toothed, incised or lobed toward the apex, entire toward the base. Umbels long-peduncled, few-rayed. Fruit oblong; lateral and central ribs strongly winged. Along streams.*

VIII. LOMATIUM Raf.

Perennial herbs, appearing stemless. Roots thickened. Leaves dissected. Flowers white or yellow, in compound umbels, with no general involucre. Calyx teeth usually wanting. Fruit orbicular, oval or oblong, much flattened dorsally, the lateral ribs extended into broad wings; oil tubes 1–4 on the intervals between wings and 2–6 on the junctions of the carpels.

1. L. orientale Coult. & Rose. White-Flowered Parsley. Downy, with peduncles 3–8 in. high. Leaves twice pinnate, the segments oblong or ovate, generally cut into rather obtuse linear or nearly linear lobes. Bracts of the involucels lanceolate, with thin membranous margins. Flowers white or pinkish. Fruit oval or round, notched at the base, smooth; oil tubes solitary in the intervals between ribs. Dry soil W.

2. L. daucifolium Coult. & Rose. Carrot-Leaved Parsley. Leaves finely dissected into short linear or thread-like segments. Petals yellow. Fruit oval, with prominent dorsal ribs. Prairies W.

IX. PASTINACA L.

A tall, smooth biennial, with a stout, grooved stem. Leaves pinnate. Flowers yellow, in large umbels, with hardly any

involucre. Calyx teeth wanting. Fruit oval, very flat, with a thin wing; oil tubes single, running the whole length.

1. **P. sativa** L. Common Parsnip. Cultivated from Europe for its large, conical, sweet and edible roots. Also introduced in waste places.

X. HERACLEUM L.

A stout perennial, with the very large leaves compound in threes. Umbels large, compound, with the involucels many-leaved. Petals white, inversely heart-shaped, the outer ones usually 2-cleft and larger. Calyx with 5 small teeth. Fruit tipped with a thick, conical enlargement of the style, with three blunt ribs on the outer surface of each carpel and a large oil tube in each interval between the ribs. Seeds flat.

1. **H. lanatum** Michx. Cow Parsnip. Stem grooved and woolly, 4–8 ft. high. Leaflets petioled, broad, deeply and irregularly toothed.

XI. DAUCUS L.

Annual or biennial, bristly-hairy herbs. Leaves pinnately twice or more compound, the divisions slender. Umbels compound, many-rayed. Flowers small, white. Calyx teeth slender or wanting. Petals notched, the point bent inward, often unequal. Fruit ovoid or ellipsoid, with rows of spines.

1. **D. Carota** L. Common Carrot. Erect, 1–3 ft. high, with a conical, fleshy, orange-colored root. Lower and basal leaves 2–3-pinnate. Central flower of each umbel and sometimes of each umbellet larger and very dark purple, with the corolla irregular. Cultivated from Europe for the edible roots; also introduced in pastures and meadows and along roadsides E.

74. CORNACEÆ. Dogwood Family

Shrubs or trees, rarely herbs. Leaves opposite or alternate, without stipules. Flowers small, actinomorphic, variously clustered. Limb of the calyx epigynous, very short. Petals 4–5, borne on the margin of a disk on top of the ovary. Stamens 4–5, inserted with the petals. Ovary 1–4-celled, with one ovule in each cell; style 1. Fruit (in our species) a 1–2-celled and 1–2-seeded drupe.

I. CORNUS L.

Trees, shrubs, or herbs. Leaves usually opposite. Flowers in forking cymes, or in umbels or heads, each with an involucre, white or yellow. Calyx teeth 4. Petals 4. Stamens 4. Ovary 2-celled. Drupe ovoidal or ellipsoidal, the stone 2-celled.

1. C. canadensis L. Dwarf Cornel, Bunchberry, Pudding Berry. Stem herbaceous, excepting at the base, low (3–9 in.), and unbranched. Rootstock rather woody, slender, and creeping. Leaves in what appears to be a whorl of 4 or 6 at the summit of the stem, sessile, ovate, oval or nearly so, acute at each end, entire, smooth or very slightly downy. Flower stalk slender, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, with a whorl of 4–6 large, white, petal-like bracts, forming an involucre round the small head of greenish flowers; the head with its involucre appearing to others than botanists like a single flower. Fruit nearly spherical, scarlet, about $\frac{1}{4}$ in. in diameter, in a close cluster, sweet and eatable, though rather insipid. Damp woods, especially N.

2. C. florida L. Flowering Dogwood. Small trees; bark rough, black. Leaves opposite, petioled, ovate to ovate-lanceolate, entire, green and shining above, paler and often downy beneath. Flowers small, greenish, in heads which are subtended by 4 large, white or pink, inversely heart-shaped bracts, thickened and greenish at the notch. Fruit ovoid, bright red. In rich woods S. and E.*

3. C. circinata L'Her. Round-Leaved Dogwood. A shrub 3–10 ft. high, with green, warty twigs. Leaves petioled, roundish-oval, contracted to an abrupt point, entire, usually rounded or truncate at the base, pale and soft-downy beneath. Flowers in flat cymes, $1\frac{1}{2}$–$2\frac{1}{2}$ in. in diameter. Fruit globose, light blue, $\frac{1}{4}$ in. or less in diameter. Thickets often in rocky soil N. and along Allegheny Mountains.

4. C. Amomum Mill. Kinnikinnik. A shrub 6–10 ft. high; twigs purple, downy when young. Leaves opposite, petioled, ovate or oblong, taper-pointed, smooth above, silky-downy below. Flowers white, in rather close cymes. Fruit blue, stone somewhat oblique. In low woods.*

5. C. asperifolia Michx. Rough-Leaved Dogwood. A shrub 8–12 ft. high; twigs slender, reddish-brown, often warty, densely downy when young. Leaves opposite, short-petioled, lance-ovate or oblong, acute or taper-pointed, with rough down above, downy-woolly below. Cymes flat, spreading, the peduncle and branches covered with rough down. Flowers white. Fruit white or pale blue, stone depressed-globose. In dry woods.*

6. C. stolonifera Michx. Red Osier Dogwood. A shrub 3–15 ft. high, with smooth, reddish-purple bark on all the younger twigs; spreading by suckers from the base and therefore the stems usually clustered. Leaves on rather slender petioles, acute or taper-pointed, rounded or tapered at the base; covered, at least beneath, by very fine, closely appressed hairs. Fruit white or nearly so, globose, $\frac{1}{4}$ in. or more in diameter. Common in wet ground, especially N.

7. C. alternifolia L. f. Alternate-Leaved Dogwood. A shrub or small tree; twigs greenish, striped. Leaves alternate, often clustered at the ends of the twigs, long-petioled, oval, acute at the apex and often at the base, minutely toothed, pale and covered with fine, appressed hairs beneath. Cymes loose and open; flowers white. Fruit deep blue. Banks of streams.*

II. NYSSA L.

Trees or shrubs. Leaves alternate, petioled, entire or few-toothed. Flowers somewhat monœcious or diœcious, the staminate in many-flowered heads or cymes, the pistillate in small clusters or solitary. Calyx tube 5-toothed or truncate. Petals minute or wanting. Stamens 5–10. Ovary 1-celled, 1-ovuled; style long and recurved. Fruit a 1-seeded drupe.

1. N. sylvatica Marsh. Black Gum. A tree with widely spreading branches and dark, rough bark; wood light-colored, very tough; base of trunk often enlarged. Leaves often clustered at the ends of the twigs, oval or obovate, taper-pointed or obtuse at the apex, entire, smooth and shining above, downy beneath, becoming bright red in autumn. Staminate flowers in heads; pistillate flowers 3–10, in a long-peduncled cluster. Fruit ovoid, dark blue or nearly black, $\frac{1}{2}$ in. long; stone slightly ridged. In rich, wet soil S. and E.*

2. N. aquatica L. Tupelo. A large tree, similar to the preceding. Leaves long-petioled, oval or ovate, acute at each end, entire or coarsely toothed, the lower sometimes heart-shaped, smooth above, downy beneath, 4–8 in. long. Staminate flowers in heads; pistillate flowers on long peduncles, solitary. Fruit ovoid, dark blue; stone sharply ridged. In swamps S. and E.*

75. PYROLACEÆ. Pyrola Family

Perennial herbs, evergreen or else pale and without chlorophyll. Petals usually free from each other and falling off separately after flowering. Stamens hypogynous, the anthers

without appendages and opening by pores or by a transverse slit. Fruit a capsule containing a great number of very small seeds.

I. CHIMAPHILA Pursh.

Low plants, nearly herbaceous, with reclining stems, from long, horizontal, underground shoots. Leaves opposite or whorled, leathery, shining, evergreen, on short petioles. Flowers fragrant, white or purplish, on a corymb or umbel which terminates the stem. Calyx 5-cleft or 5-parted, persistent. Petals 5, concave, roundish, spreading. Stamens 10, the filaments enlarged and downy in the middle, the anthers somewhat 4-celled, opening when mature by pores at the outer end. Style top-shaped, nearly buried in the top of the globular ovary. Capsule erect, 5-celled.

1. C. umbellata Nutt. Prince's Pine, Pipsissewa. Branches leafy, 4–12 in. high. Leaves spatulate or wedge-oblanceolate, obtuse or nearly so, sharply serrate, very green and glossy. Flowers several, umbeled or somewhat corymbed, white or pinkish, the anthers violet. Dry woods, especially under pine trees.

2. C. maculata Pursh. Spotted Wintergreen. Much resembles No. 1, but has only scattered teeth on the leaves, which are mottled with white on the upper surface and are often broad or rounded at the base. Dry woods.

II. PYROLA L.

Biennial or perennial, almost woody herbs; rootstocks slender and creeping. Leaves mostly basal, with broad petioles, evergreen. Flowers in racemes, nodding, on a bracted scape. Sepals 5. Corolla usually globose, of 5 free or nearly free, roundish petals. Stamens 10, in pairs opposite the petals, hypogynous; anthers as in *Chimaphila*. Capsule globose, 5-celled, splitting into 5 valves, the latter usually with downy edges.

1. P. elliptica Nutt. Shin Leaf. Scape 5–10 in. high. Leaf blades obovate-oval or elliptical, rather thin, dark green, faintly scalloped, almost always longer than their margined petioles. Flowers greenish-white, very fragrant. Rich, usually dry, woods, especially N.

2. P. americana Sweet. Round-Leaved Wintergreen. Scape 6–20 in. high. Leaf blades roundish or oval, leathery, shining above,

faintly scalloped, often rounded at the base or almost heart-shaped, usually shorter than the slightly margined petioles. Flowers white, very fragrant. Varies greatly. Usually in dry woods N.

III. MONOTROPA L.

Leafless, simple, erect, white, brown, or red root parasites or saprophytes or fed by slender fungus threads which cluster on the roots. Stem scaly, the upper scales often passing into bracts. Flowers solitary or in spikes or racemes. Sepals or bracts 2–5, erect, deciduous. Petals 4 or 5, erect or spreading. Stamens 8 or 10, hypogynous, the filaments awl-shaped; anthers kidney-shaped. Ovary 4–5-celled; style simple; stigma disk-like, with 4–5 rays.

B.Fl. species 2 (*Hypopitys*).

1. M. uniflora L. Indian Pipe. Stem smooth, fleshy, 4–6 in. high. Bracts ovate or lanceolate. Flower single, tubular, ¾–1 in. long, inodorous. Stamens a little shorter than the petals. Capsule angled, ½–¾ in. long. Whole plant waxy-white, turning black in drying. In moist, shady woods N. and E.*

2. M. Hypopitys L. Pinesap. Stems single or clustered, white or reddish, 4–8 in. high. Bracts ovate-lanceolate. Flowers several, in a scaly raceme, fragrant, ½–¾ in. long. Capsule oval, ¼ in. long. In dry, shady woods, especially under oaks or pines.*

76. ERICACEÆ. Heath Family

Usually shrubs or slightly shrubby plants. Leaves simple, generally alternate. Corolla commonly actinomorphic, 4–5-cleft, sometimes choripetalous. Stamens hypogynous, distinct, as many or twice as many as the petals; the anthers mostly opening by a hole at the end. Ovary usually with as many cells as there are corolla lobes; style 1. Seeds small, with endosperm.

A

Shrubs or small trees. Calyx free from the ovary. Corolla hypogynous, usually sympetalous.

Shrubs or small trees, with showy flowers. Anthers not held down in pockets in the corolla. Rhododendron, I

Shrubs with showy flowers. Anthers at first held in pocket-like depressions in the corolla. Kalmia, II

Shrubs with small, mostly white, urn-shaped flowers. Lyonia, III

A prostrate plant, hardly at all shrubby. Leaves rather large, often 1½ in. wide, and veiny. Epigæa, IV

A trailing plant with small (about ¼ in. wide), thick, evergreen leaves. Arctostaphylos, V

B

Shrubs. Flowers epigynous; corolla sympetalous. Fruit a true berry or resembling one.

Fruit a berry-like drupe, with 10 nutlets which resemble seeds. Gaylussacia, VI

Fruit a berry with many small seeds. Vaccinium, VII

I. RHODODENDRON L.

Shrubs, often much branched. Leaves alternate, thin, deciduous. Flowers very showy, in terminal umbels, from scaly buds which became well developed the previous season. Calyx very small, 5-parted. Corolla bell-shaped, the tube long and slender, the limb spreading and somewhat one-sided. Stamens 5 or 10, declined; anthers awnless. Style long and slender, declined; stigma knobbed. Capsule oblong or linear, 5-celled, many-seeded; seeds very small, scale-like.

1. R. viscosum Torr. Swamp Honeysuckle, Swamp Pink. A shrub, 4–6 ft. high; branches hairy. Leaves obovate, leathery, mucronate at the apex, mostly smooth above, downy on the veins beneath; petioles very short. Flowers appearing later than the leaves, white, fragrant, 1½–2 in. long; tube long, glandular-viscid. Capsule erect, ½–⅔ in. long, bristly. In swamps.*

2. R. nudiflorum Torr. Wild Honeysuckle, Election Pink. A branching shrub, 4–6 ft. high; twigs smooth or with a few coarse hairs. Leaves obovate or oblong, ciliate-serrate, downy, becoming smooth above; petioles short. Flowers appearing with or before the leaves, pink or white, sometimes yellowish, fragrant, 1–2 in. wide, tube downy but not glandular. Capsule erect, linear-oblong, ⅔–¾ in. long. Swamps and banks of streams; flowers extremely variable in size and color.*

II. KALMIA L.

Erect and branching shrubs. Leaves alternate, opposite or in threes, entire, leathery, evergreen. Flowers showy, in corymbs, or 1–3 in the axils. Calyx 5-parted. Corolla flat-bell-shaped or wheel-shaped, 5-lobed. Stamens 10, the anthers placed in pouches in the corolla, filaments straightening elastically at maturity and so bringing the anthers in contact with any large insect-visitor. Style long and slender. Capsule globose, 5-celled, many-seeded.

1. K. latifolia L. Calico Bush, Mountain Laurel. A shrub, 4–10 ft. high. Branches stout, smooth. Leaves mostly alternate, petioled, elliptical or oval, acute at each end, smooth and green on both sides. Corymbs terminal, compound. Flowers white to rose color, showy, 1 in. broad. Calyx and corolla glandular; pedicels long, slender, sticky-glandular, erect in fruit; calyx and style persistent. Shady banks on rocky or sandy soil.*

2. K. angustifolia L. Sheep Laurel, Lambkill. A shrub, 1–3 ft. high, with smooth, nearly erect branches. Leaves petioled, opposite or in threes, oblong, obtuse at both ends, dark green above, paler beneath. Corymbs lateral, glandular. Flowers purple or crimson, $\frac{1}{2}$–$\frac{3}{4}$ in. broad. Pedicels slender, recurved in fruit. Calyx downy, persistent. Style persistent; capsule depressed-globose. On hillsides; abundant northward.*

III. LYONIA Nutt.

Shrubs or small trees. Leaves alternate, persistent or falling late. Flowers mostly white, in panicles, racemes, or umbels. Calyx 5-parted; corolla urn-shaped. Stamens 10; filaments hairy, often with teeth or appendages; anthers oblong or ovoid. Capsule globose or nearly so, 5-angled. Seeds sawdust-like, with a loose outer coat.

B. Fl. species 1 (*Pieris*); species 2 (*Xolisma*).

1. L. mariana D. Don. Staggerbush. A smooth shrub, 20–40 in. high. Leaves oval or oblong, smooth above, slightly downy on the veins beneath. Flowers nodding, on leafless shoots. Filaments with 2 teeth near the apex. Capsule ovoid-pyramidal, truncate at its apex. Low, sandy soil. Foliage said to be poisonous.

2. L. ligustrina DC. Male Berry. A minutely downy shrub, 1$\frac{1}{2}$–10 ft. high. Leaves varying from obovate to ovate, finely serrate or entire. Racemes usually leafless, crowded in terminal panicles. Filaments flat, without appendages. Capsule globose. Moist thickets and swamps.

IV. EPIGÆA L.

Prostrate or trailing shrubs. Stems rusty-downy, 6–12 in. long. Leaves alternate, leathery, evergreen. Flowers in bracted, terminal, close racemes or clusters. Calyx 5-parted, persistent. Corolla salver-shaped, 5-lobed. Stamens 10, about the length of the corolla tube. Ovary 5-lobed; style columnar; stigma 5-lobed. Fruit a globose, hairy, 5-celled, many-seeded capsule.*

1. E. repens L. Ground Laurel, Trailing Arbutus, May-flower. Stems creeping, the young twigs ascending. Leaves oval or somewhat heart-shaped, entire, netted-veined, smooth above, rough-hairy beneath; petioles short, rough-hairy. Racemes shorter than the leaves. Flowers white to bright pink, ½ in. broad, very fragrant. In dry woods, often covering considerable areas.*

V. ARCTOSTAPHYLOS Adans.

Shrubs. Leaves alternate, evergreen. Flowers pinkish or nearly white, in terminal, bracted racemes. Calyx 4–5-parted, persistent. Corolla 4–5-lobed, the lobes recurved. Ovary 5–10-celled, each cell containing 1 ovule. Fruit a berry-like drupe, with 5–10 nutlets.

1. A. Uva-ursi Spreng. Bearberry. In trailing clumps, the branches 1–2 ft. high. Leaves evergreen, finely woolly, obovate or spatulate, entire, very leathery. Racemes few-flowered, very short. Corolla urn-shaped, the teeth hairy within. Berry red, ¼ in. in diameter. Rocks and dry hilltops, especially N.

VI. GAYLUSSACIA HBK.

Low, branching shrubs, mostly resinous-dotted. Leaves serrate or entire. Flowers small, white or pink, in lateral, bracted racemes, nodding; pedicels usually 2-bracteolate. Calyx tube short, obconic, the lobes persistent. Corolla ovoid to bell-shaped, 5-lobed, the lobes erect or recurved. Stamens equal, usually included; anthers awnless. Fruit a 10-seeded, berry-like drupe.*

1. G. frondosa T. & G. Tangleberry, Dangleberry. An erect shrub, 1–3 ft. high; branches spreading, slender, gray, slightly downy. Leaves entire, oblong or obovate, obtuse, thin, smooth and green above; paler, downy, and with resinous dots, beneath; petioles short.

Racemes few-flowered. Corolla small, greenish-pink, short-bell-shaped; bracts small, oblong, shorter than the pedicels. Berry depressed-globose, dark blue, with bloom, sweet, about $\frac{1}{3}$ in. in diameter. On low ground.*

2. G. baccata K. Koch. HUCKLEBERRY. A much-branched, stiff shrub, 1–3 ft. high, slightly downy when young. Leaves oval or oblong, rarely obovate, obtuse or nearly so, entire, covered when young with little resinous particles. Flowers in short, one-sided racemes. Corolla at first conical-ovoid, becoming afterward nearly cylindrical, pink or reddish. Fruit (in the typical form) black, with no bloom, sweet; the seed-like nutlets rather large. Woods and pastures in sandy soil.

VII. VACCINIUM L.

Shrubs or small trees. Leaves entire or serrulate, often leathery and evergreen. Flowers terminal or lateral, clustered or solitary, nodding. Pedicels 2-bracteolate. Calyx tube globose or hemispherical, 4–5-lobed, persistent. Corolla urn-shaped, cylindrical or bell-shaped, 4–5-lobed. Stamens twice as many as the lobes of the corolla; anthers awned or awnless. Ovary 4–5-celled, each cell partially divided by a partition, which makes the ovary appear 8–10-celled; style slender; stigma simple. Fruit a many-seeded berry.*

B. Fl. species 1 (*Batodendron*); species 2 (*Polycodium*); species 6 (*Oxycoccus*).

1. V. arboreum Marsh. FARKLEBERRY. Tree-like, sometimes 30 ft. high; bark gray; twigs slender, smooth or downy. Leaves deciduous, ovate or oval, mucronate, entire or glandular-dentate, leathery, green above, often slightly downy beneath. Racemes with leaf-like bracts; pedicels slender, drooping. Corolla campanulate, white. Anthers included; style projecting. Berry globose, black, mealy, ripening in winter. Common in dry, open woods.*

2. V. stamineum L. DEERBERRY, SQUAW HUCKLEBERRY. An erect shrub, 3–10 ft. high; branches widely spreading, twigs smooth or minutely downy. Leaves deciduous, oval or oblong, acute or taper-pointed at the apex, obtuse or slightly heart-shaped at the base, firm, smooth, and green above, pale and slightly downy beneath, petioled. Racemes with leaf-like bracts. Flowers numerous, drooping, on jointed, slender pedicels. Corolla bell-shaped, purplish-green, 2-awned anthers and style projecting. Berry globose or pear-shaped, inedible. Dry woods.*

3. V. pennsylvanicum Lam. DWARF BLUEBERRY, LOW BLUEBERRY. Low (usually 6–12 in. high, sometimes 2 ft. high) and smooth, with

warty green branches. Leaves oblong or oblong-lanceolate, sharply serrate, with little bristle-pointed teeth, both sides smooth and shining except for down occasionally on the midrib and veins below, pointed at both ends. Flowers few in a cluster, longer than their minute pedicels. Corolla oblong, bell-shaped, a little narrowed at the throat, white or pinkish. Berry blue, with much bloom, ripening earlier than the other eatable species, sweeter than No. 5 but not so high-flavored. In dry or sandy soil, especially N.

4. V. vacillans Kalm. LATE LOW BLUEBERRY. A low, stiff, smooth shrub, 1–3 ft. high; branches yellowish-green. Leaves obovate or oval, pale or dull green, smooth beneath, entire or nearly so. Flowers greenish-yellow or somewhat pink. Berries late-ripening, blue, with some bloom, sweet. Dry, especially sandy, soil.

5. V. corymbosum L. HIGH-BUSH BLUEBERRY. An erect shrub, 6–12 ft. high; branches stiff, young twigs minutely warty. Leaves deciduous, oval to ovate-lanceolate, acute, margins bristly, serrulate, smooth or downy, short-petioled. Racemes numerous, appearing with or before the leaves. Bracts oval or oblong, deciduous. Flowers white or pink. Corolla almost as long as the pedicel, cylindrical. Berry globose, blue or black, flavor slightly acid, pleasant. Common in woods and thickets. Whole plant extremely variable.*

6. V. macrocarpon Ait. CRANBERRY. Stems creeping, thread-like, 1–3 ft. or more in length, the branches not quite erect, sometimes 8 in. high. Leaves usually oval or oblong, obtuse, thickish, evergreen, the younger ones with the margins somewhat rolled under. Flowers nodding. Petals strongly reflexed, deep rose-red inside at the base, pale pinkish or almost white at the tips. Stamens with the filaments hardly $\frac{1}{3}$ as long as the anthers. Fruit red or reddish-purple, ellipsoidal or nearly globose, very acid, much valued for sauce, pies, and jellies. Common in peat bogs and wet meadows N.

77. PRIMULACEÆ. PRIMROSE FAMILY

Herbs, with simple leaves, often most or all of them basal. Flowers bisexual and actinomorphic, generally sympetalous. Stamens commonly 5, inserted on the corolla, opposite its lobes. Pistil consisting of a single stigma and style and a (generally free) 1-celled ovary, with a free central placenta.

A

Leaves all basal.

(*a*) Segments of corolla not reflexed, throat open. Stamens included. Primula, I

(*b*) As in (*a*), but throat of corolla narrowed. Androsace, II

(*c*) Segments of corolla much reflexed. Stamens protruding. Dodecatheon, VIII

B

Stems leafy, at least near the summit.

(*a*) Corolla yellow. No sterile appendages alternating with the stamens. Lysimachia, III

(*b*) Corolla yellow. Sterile appendages alternating with the stamens. Steironema, IV

(*c*) Corolla white. Stems with leaves mostly whorled near the summit. Trientalis, V

(*d*) Corolla scarlet (sometimes white or blue). Stems low, leafy throughout. Anagallis, VI

(*e*) Corolla inconspicuous, pink. Stems leafy, very short. Centunculus, VII

I. PRIMULA L.

Low, perennial herbs, with much-veined basal leaves ; scapes each bearing an umbel of flowers, which are often showy. Calyx tubular, decidedly angled, 5-cleft. Corolla more or less salver-shaped, with the tube widened above the insertion of the stamens ; the 5 lobes of the limb often notched or cleft. Stamens 5, not protruding outside the corolla tube. Capsule egg-shaped, splitting at the top into 5 valves, each of which may divide in halves.

1. P. grandiflora Lam. True Primrose. Leaves spatulate or obovate-oblong. Flowers rising on separate slender pedicels from the leaf axils. Corolla originally pale yellow, but varying to white, red, and many intermediate shades, with a broad, flat limb. Cultivated from Europe.

2. P. sinensis Sabine. Chinese Primrose. A rather coarse, downy plant. Leaves round-heart-shaped, more or less lobed and cut, long-petioled. Flowers large, in umbels, usually rose color or white. Calyx large, inflated and conical. Cultivated as a house plant from China.

II. ANDROSACE L.

Small herbs, with clustered basal leaves. Flowers very small, solitary or umbeled. Calyx 5-cleft, with a short tube. Corolla salver- or funnel-shaped, contracted at the throat, its tube

shorter than the calyx. Stamens 5, perigynous, not protruding from the tube of the corolla. Capsule 5-valved, few–many-seeded.

1. **A. occidentalis** Pursh. Annual, smooth or nearly so. Scapes usually clustered, 1–3 in. high, erect or ascending. Lobes of the calyx becoming leafy. Corolla white, shorter than the calyx. In dry soil W.

III. LYSIMACHIA L.

Perennials, with opposite or whorled entire leaves, which are often dotted. Calyx 5–6-parted. Corolla wheel-shaped, with its divisions commonly nearly separate. Stamens generally somewhat monadelphous at the base.

B. Fl. species 4 (*Naumburgia*).

1. **L. quadrifolia** L. Four-Leaved Loosestrife. Stem erect and simple, 1–2 ft. high, hairy. Leaves whorled, most frequently in fours, broadly lanceolate. Flowers small, axillary, and solitary, on long and slender peduncles. Damp or sandy soil.

2. **L. terrestris** BSP. Bulb-Bearing Loosestrife. Stems 1–2 ft. high, finally branching, frequently producing bulblets in the leaf axils after flowering. Leaves abundant, generally opposite, narrowly lanceolate. Flowers small, pediceled, in a long, terminal raceme. Low or swampy ground.

3. **L. Nummularia** L. Moneywort. Stems creeping, smooth. Leaves small, round or nearly so. Flowers solitary in the leaf axils, yellow, ½–1 in. in diameter. Cultivated and escaping into moist ground. Introduced from Europe.

4. **L. thyrsiflora** L. Tufted Loosestrife. Stem simple, erect, 1–2 ft. high. Leaves all opposite and lanceolate except the lower ones. Racemes spike-like, 1 in. or less long, borne in the leaf axils near the middle of the stem. Flowers small, light yellow with black spots. In swamps.

IV. STEIRONEMA Raf.

Perennial herbs. Leaves opposite or whorled, simple, entire. Flowers yellow, axillary or racemose, on slender peduncles. Calyx tube 5-parted, persistent. Corolla 5-parted, wheel-shaped, tube very short or none, the lobes denticulate at the apex, and in the bud each one inclosing a stamen. Stamens 5, distinct or slightly united at the base; sterile rudiments often alternating with them. Ovary globose; style slender. Fruit a globose, 5-valved, few- or many-seeded capsule.*

1. S. ciliatum Raf. FRINGED LOOSESTRIFE. Stems erect, slender, simple or branched, 1–3 ft. high. Leaves opposite, ovate to ovate-lanceolate, acute at the apex, rounded at the base; margins and petioles hairy-fringed. Flowers solitary on axillary peduncles, ¾–1 in. broad; petals broadly ovate or roundish, denticulate; calyx shorter than the capsule. Woods and thickets.*

2. S. lanceolatum Gray. LANCE-LEAVED LOOSESTRIFE. Stem erect, 6–24 in. high. Leaves varying from lanceolate to oblong and linear, petioled or almost sessile, acute or taper-pointed. Flowers ⅜–¾ in. in diameter. Capsule nearly as long as the segments of the calyx. In moist ground and thickets.

3. S. quadriflorum Hitchc. LINEAR-LEAVED LOOSESTRIFE. Stem erect, 4-sided, slender, 1–3 ft. high. Basal leaves oblong or linear-oblong, on slender petioles; stem leaves, all but the lowest, nearly or quite sessile, narrowly linear, 2–4 in. long, smooth and shining. Flowers about ⅜ in. in diameter, often clustered in fours at the ends of the branches. Corolla lobes pointed. Along streams, especially N.W.

V. TRIENTALIS L.

Low, smooth, perennial herbs, with slender, erect, unbranched stems. Leaves lanceolate, ovate, or oblong, mostly in a whorl at the summit of the stem. Flowers one or few, terminal, on slender peduncles, small, white or pink. Sepals narrow and spreading. Corolla wheel-shaped, with usually 7 taper-pointed segments. Ovary globose; style thread-like. Capsule globose, many-seeded.

1. T. americana Pursh. STAR FLOWER, CHICKWEED WINTERGREEN. Spreading by long and slender rootstocks; branches erect, stem-like, 3–9 in. high. Leaves very thin, pale green, pointed at both ends. Flowers white. Capsules white, marked off into polygonal sections, each corresponding to 1 seed. Cold woods; common N.

VI. ANAGALLIS L.

Annual or perennial herbs. Stems erect or diffuse. Leaves opposite or whorled. Flowers axillary, peduncled. Calyx tube 5-parted, persistent. Corolla wheel-shaped, 5-parted, longer than the calyx. Stamens 5, inserted on the base of the corolla; filaments bearded. Ovary globose; style slender; stigma knobbed. Fruit a many-seeded capsule, the top coming off like a lid.*

1. A. arvensis L. Poor Man's Weatherglass, Pimpernel. Annual; stem spreading, widely branched, 4-angled, smooth, 4–12 in. long. Leaves opposite, sessile, ovate, black-dotted beneath. Flowers on peduncles longer than the leaves, nodding in fruit. Corolla fringed with glandular hairs, longer than the acute calyx lobes, bright red (sometimes white or blue), opening in sunshine. Capsule globose, tipped by the persistent style. Introduced, and common in fields and gardens.*

VII. CENTUNCULUS L.

Small annuals, with alternate entire leaves. Flowers axillary and solitary, inconspicuous. Calyx 4–5-parted. Corolla 4–5-cleft, shorter than the calyx, the tube urn-shaped. Stamens 4–5, perigynous, with short filaments. Capsule globose, many-seeded, the top falling off as a lid.

1. C. minimus L. Chaffweed, False Pimpernel. Stems 1–6 in. high. Leaves spatulate or obovate, with short petioles. Flowers small, pink, nearly sessile, parts of the perianth usually in fours. Moist soil W.

VIII. DODECATHEON L.

A smooth, perennial herb, with a cluster of oblong or spatulate basal leaves, fibrous roots, and an unbranched scape, leafless except for an involucre of small bracts at the summit, with a large umbel of showy, nodding flowers. Calyx deeply 5-cleft, with reflexed, lanceolate divisions. Tube of the corolla very short, the divisions of the 5-parted limb strongly reflexed. Filaments short, somewhat united at the base; anthers long, acute, and combining to form a conspicuous cone.

1. D. Meadia L. Shooting Star, Indian Chief. Corolla varying from rose color to white. In rich woods in most of the Middle and Southern states. Often cultivated.

78. EBENACEÆ. Ebony Family

Trees or shrubs. Leaves alternate, entire, pinnately veined, without stipules. Flowers often diœcious. Calyx free from the ovary, persistent. Stamens 2–4 times as many as the divisions of the corolla. Ovary 3–12-celled; ovules 1 or 2 in each cell. Fruit a berry. Mostly tropical plants.

DIOSPYROS L.

Flowers dicœcious or somewhat moncœcious, the staminate ones in cymes, the pistillate ones axillary and solitary. Calyx 4–6-lobed. Corolla 4–6-lobed. Stamens in the staminate flowers usually 16, in the pistillate ones 8, imperfect. Fruit large, with the persistent calyx attached to its base, 4–8-seeded.

1. **D. virginiana** L. PERSIMMON. Trees, with rough, black bark, and very hard wood. Leaves oval or ovate-oblong, acute or acuminate at the apex, rounded or slightly cordate at the base, entire and dark green, smooth above, pale and often downy beneath, short-petioled, deciduous. Flowers yellowish-white, the parts mostly in fours. Fruit globose, edible when ripe, very astringent when green; seeds large, compressed, often wanting. Fruit ripening late in the fall. Common in old fields and along roadsides S. and S.W.*

79. OLEACEÆ. OLIVE FAMILY

Shrubs or trees. Leaves opposite, simple or odd-pinnate, without stipules. Flowers usually in forking cymes, small, white, greenish or yellow, bisexual or unisexual. Calyx free from the ovary, 4-lobed or wanting. Corolla hypogynous, regular, 4-parted or of 4 separate petals, sometimes wanting. Stamens 2, borne on the petals or hypogynous. Ovary 2-celled. Fruit 1–2-celled, each cell 1-seeded, rarely 2-seeded (in *Forsythia* many-seeded).

I. FRAXINUS Tourn.

Deciduous trees. Flowers dicœcious. Petals wanting (in our species). Stamens 2, hypogynous. Fruit a 1–2-celled key, each cell 1-seeded.

1. **F. americana** L. WHITE ASH. A large tree; bark rough, gray; wood hard, strong, elastic; twigs and petioles smooth. Leaflets usually 7, ovate to ovate-lanceolate, taper-pointed at the apex, rounded or obtuse at the base, entire or slightly serrate, smooth above, often downy beneath, short-stalked. Flowers mostly dicœcious. Calyx of the pistillate flowers persistent. Key 1½–2 in. long, winged only at the apex; wing spatulate or oblanceolate. In rich woods and swamps.*

2. **F. pennsylvanica** Marsh. RED ASH. A small tree; bark rough, dark gray; twigs and petioles densely velvety-downy. Leaflets 5–9, oblong-ovate to ovate-lanceolate, taper-pointed at the apex, narrowed

into a short stalk at the base, finely serrate, smooth above, velvety-downy beneath. Calyx of the pistillate flowers persistent. Key 1½–2 in. long, the wing somewhat extended along the sides, oblanceolate or spatulate, often notched. Swamps and moist soil.*

3. F. caroliniana Mill. WATER ASH. A small tree; wood soft, light, and weak; twigs smooth or downy. Leaflets 5–7, ovate or elliptical, acute at the apex, acute or obtuse at the base, entire or slightly serrate, smooth or slightly downy, stalked. Flowers dicœcious. Calyx persistent. Key often 3-angled or 3-winged, wings running nearly to the base, oblong or oval, pinnately-veined. In swamps and wet soil.*

4. F. quadrangulata Michx. BLUE ASH. A large tree, with wood heavy, but not as tough as No. 1; the most vigorous twigs usually square. Leaflets 7–9, with short stalks, somewhat ovate or lanceolate, acute, sharply serrate. Fruit winged to the base, of nearly the same width throughout, narrowly oblong. Rich woods, especially W.

II. FORSYTHIA Vahl.

Shrubs. Leaves opposite or in threes, appearing later than the flowers, serrate. Calyx very short, deciduous. Corolla yellow, bell-shaped, its lobes long and slender. Stamens inserted on the base of the corolla tube. Pod 2-celled, many-seeded.

1. F. viridissima Lindl. A hardy shrub, with branches erect or nearly so. Leaves all simple, lance-oblong. Calyx lobes half as long as the tube of the corolla. Lobes of the corolla spreading, narrow-oblong. Style equal in length to the tube of the corolla. Cultivated from Asia.

2. F. suspensa Vahl. A hardy shrub, with drooping branches. Leaves broadly ovate, often some of them with 3 leaflets, the lateral leaflets small. Lobes of the corolla longer, broader, and more spreading than in No. 1. Style shorter than the tube of the corolla. Cultivated from Asia. Less common than No. 1; often trained over porches and arbors.

III. SYRINGA L.

Tall shrubs, forking frequently, from the failure of the terminal buds on most branches. Leaves simple, entire. Flowers in close, compound panicles. Calyx 4-toothed. Corolla salver-shaped, the tube long, the limb 4-lobed. Pod dry, flattened at right angles to the partition, 4-seeded.

1. S. vulgaris L. COMMON LILAC. A strong-growing, hardy bush. Leaves ovate, somewhat heart-shaped. Flowers sweet-scented, in very close, large clusters, lilac or white. Corolla lobes concave. Very commonly cultivated from eastern Europe.

2. S. persica L. Persian Lilac. A more slender and less branched shrub than No. 1. Leaves lance-ovate, somewhat narrowed or tapering at the base. Flowers in rather loose clusters, not very sweet-scented, pale lilac or white. Corolla lobes ovate, somewhat bent inward. Pods linear. Cultivated from western Asia, less common than No. 1.

IV. CHIONANTHUS L.

Shrubs or small trees. Leaves simple, opposite, entire, petioled, deciduous. Flowers in panicles borne on wood of the previous season. Calyx small, 4-cleft, persistent. Corolla wheel-shaped, 4-parted, the lobes long and linear. Stamens 2–4, included, inserted on the base of the corolla. Style short; stigma 2-lobed. Fruit a 1-seeded drupe.*

1. C. virginica L. Fringe Tree, Old Man's Beard. A small tree, with smooth, light gray bark and spreading branches. Leaves oval to oblong, acute or obtuse at each end, smooth or slightly downy. Panicles large and loose, leafy-bracted, appearing with the leaves. Flowers on slender, drooping pedicels. Petals 1 in. or more in length. Fruit ovoid, purple, $\frac{1}{2}$–$\frac{2}{3}$ in. long. Along streams, usually on light soil.*

V. LIGUSTRUM L.

Shrubs. Leaves simple, opposite, entire, deciduous or sometimes persistent. Flowers in terminal panicles or similar clusters, white, small. Calyx minutely 4-toothed or truncate. Corolla funnel form, 4-lobed. Stamens 2, short, inserted in the tube of the corolla. Ovary free, 2-celled, 2 ovules in each cell; style short. Fruit a 1–4-seeded, globose berry.*

1. L. vulgare L. Privet. A branching shrub, 4–10 ft. high; branches long and slender. Leaves somewhat leathery, lanceolate to obovate, short-petioled, tardily deciduous. Panicles dense, minutely downy. Flowers $\frac{1}{4}$ in. wide, fragrant. Stamens included. Berries black. Introduced from Europe and used largely for hedges.*

80. GENTIANACEÆ. Gentian Family

Annual or perennial herbs. Leaves entire, usually opposite, sometimes alternate, without stipules. Flowers actinomorphic, solitary or in cymes. Calyx hypogynous, 4–8-toothed or lobed. Corolla hypogynous, wheel-, bell-, or funnel-shaped,

4–8-lobed. Stamens 4–8, inserted on the corolla tube; filaments thread-shaped; anthers facing inwards. Ovary 1–2-celled; ovules many, on 2 opposite placentas. Capsule 1-celled or partially 2-celled, 2-valved, many-seeded. [The best known genus, *Gentiana*, consists mainly of autumn-flowering species.]

I. OBOLARIA L.

A low, smooth, purplish-green perennial. Flowers axillary and terminal. Calyx of 2 distinct, spatulate, bract-like sepals. Corolla tubular-bell-shaped, 4-lobed. Stamens short, inserted at the notches of the corolla. Style short; stigma 2-lipped. Capsule ovoid, more or less 2–4-celled; seeds very minute and numerous.

1. O. virginica L. Pennywort. Stem 3–8 in. high, often several from the same root. Leaves somewhat fleshy, wedge-obovate or somewhat diamond-shaped, often truncate, sessile. Flowers opposite or terminal in threes, nearly sessile. Corolla pale purple or nearly white. Rich woodlands, among dead leaves.

II. MENYANTHES L.

Perennial, scape-bearing marsh herbs. Rootstock creeping. Leaves of 3 leaflets. Flowers racemed. Calyx 5-parted. Corolla fleshy, funnel-shaped, the limb 5-parted. Stamens 5, inserted on the corolla tube. Disk of 5 hypogynous glands. Ovary 1-celled; style thread-shaped; stigma 2-lobed. Capsule globose, many-seeded.

1. M. trifoliata L. Buck Bean, Marsh Trefoil. Rootstocks stout and matted. Leaflets obtuse, entire. Flowers $\frac{2}{3}$ in. in diameter, white or pinkish. Bogs, especially N.

81. APOCYNACEÆ. Dogbane Family

Trees, shrubs, or herbs, with milky juice, often climbing. Leaves usually opposite, rarely whorled, entire, nearly or quite without stipules. Flowers actinomorphic, solitary or in cymes. Calyx 4–5-cleft. Corolla hypogynous, funnel-, salver-, or bell-shaped, sometimes with scales in the throat. Stamens 4–5, borne on the corolla tube or throat; filaments very short;

anthers somewhat attached to the stigma. Ovary of 2 carpels, free or somewhat united; style short; stigma entire or 2-cleft. Fruit of 2 many-seeded pods (in the genera here described).

I. AMSONIA Walt.

Perennial herbs. Stems erect, branched. Leaves alternate. Flowers in terminal panicles. Calyx small, 5-parted. Corolla small, pale blue, funnel- or salver-form, downy within. Stamens inserted above the middle of the tube, included. Ovary of 2 carpels, united at the top by the slender style; stigma globose, surrounded by a cup-shaped appendage. Fruit 2 slender, erect, many-seeded follicles; seeds without tufts of hairs.*

1. **A. Tabernæmontana** Walt. AMSONIA. Stem smooth and glabrous, branched above, 2–3 ft. high. Leaves lanceolate, entire, acuminate at the apex, acute at the base, smooth above, with a bloom or slightly downy beneath, short-petioled. Flowers numerous, on bracted pedicels. Corolla tube slender, smooth or sometimes downy above; the lobes narrow, as long as the tube. Follicles slender, spreading, 4–6 in. long; seeds downy. Swamps and wet ground S.*

II. VINCA L.

Perennial herbs or small, slender shrubs; juice not perceptibly milky. Leaves evergreen. Flowers solitary, white, blue, or purple. Calyx 5-parted; lobes taper-pointed, glandular inside at the base. Corolla salver-shaped, thickened at the throat, 5-lobed. Stamens 5, inserted on the upper or middle part of the corolla tube. Ovary of 2 carpels. Pods 2, slender, cylindrical, many-seeded.

1. **V. minor** L. PERIWINKLE. Stem slender, trailing, often rooting at the nodes, 1–3 ft. long. Leaves ovate, acute at the apex, short-petioled, bright green. Flowers axillary, solitary, 1 in. wide. Calyx with linear lobes nearly as long as the inflated tube of the blue corolla. Matured pods slender, slightly divergent. Introduced from Europe and common in gardens.*

III. APOCYNUM L.

Perennial herbs. Stems with very tough bark, branched above. Leaves opposite, entire. Flowers in terminal and axillary bracted cymes. Calyx small, 5-parted, lobes acute.

Corolla bell-shaped, 5-lobed, with a small, scale-like appendage at the base of each lobe. Stamens 5, distinct, inserted on the base of the corolla tube. Ovaries 2, distinct, united by the styles; stigma obtuse, 2-lobed. Pods long, slender, many-seeded; seeds with a tuft of hairs.*

1. A. androsæmifolium L. Dogbane. Plant 2–3 ft. high, usually smooth, purplish, the branches spreading and forking. Leaves 2–3 in. long, acute, mucronate; petioles about ¼ in. long. Cymes mostly terminal, few-flowered. Calyx teeth lance-ovate, about half as long as the corolla tube. Corolla pale red or whitish, its lobes recurved. Pods stouter than in No. 2. Roadsides and clearings; common.

2. A. cannabinum L. Indian Hemp. Stem erect, smooth, with numerous erect or ascending branches. Leaves oval to oblong, mucronate at the apex, rounded at the base, downy beneath, short-petioled. Cymes terminal, compact, shorter than the leaves. Flowers are on short, bracted pedicels, greenish-white, about ¼ in. broad. Calyx lobes lanceolate, nearly as long as the tube of the corolla. Corolla lobes erect. Pods very slender, tapering, 3–4 in. long. Along fences and in thickets.*

IV. NERIUM L.

Shrubs. Leaves mostly whorled in threes. Flowers in terminal cymes. Calyx small, lobes acute. Corolla salverform, the throat of the tube crowned with cleft or cut-fringed scales. Stamens 5, short, included; anthers tipped with a hairy bristle. Ovary of 2 carpels; style short. Pods erect; seeds with a tuft of hairs.*

1. N. Oleander L. Oleander. Stem erect, diffusely branched from below, 4–10 ft. high. Leaves narrowly elliptical, acute at each end, thick and leathery, short-petioled. Flowers showy, in large clusters, red or white, often double; scales of the crown 3–4-pointed unequal teeth. Pods spindle-shaped, 3–4 in. long. Introduced from Palestine. Common in cultivation.*

82. ASCLEPIADACEÆ. Milkweed Family

Shrubs or herbs, often twining; juice usually milky. Leaves generally opposite or whorled, entire, without stipules. Flowers regular. Calyx 5-parted. Corolla 5-parted. Stamens 5; the filaments usually united around the styles, often with

hood-like appendages, each with an incurved horn borne on the stamen tube and forming a crown around the stigma (Fig. 27, *A*); anthers pressing against the lobes of the stigma; the pollen clinging together in tough, waxy or fine-grained

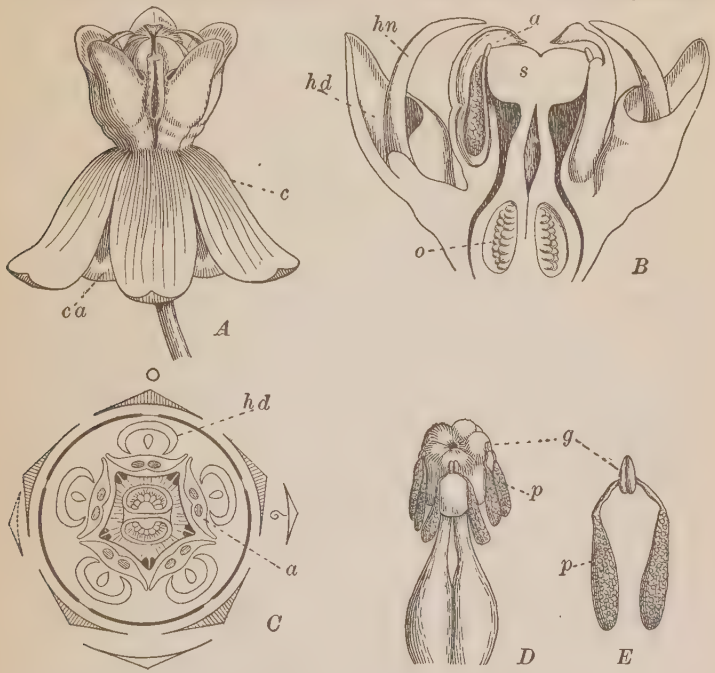


FIG. 27. Flower of *Asclepias syriaca*

A, entire flower; *B*, vertical section; *C*, diagram; *D*, details of pollen-masses and glands. *ca*, calyx; *c*, corolla; *hd*, hood; *hn*, horn; *a*, anther; *s*, stigma; *o*, ovary; *g*, gland; *p*, pollen-mass. (All considerably enlarged.)

masses. Ovary free from the calyx tube, of 2 carpels, more or less united below but unconnected above; styles 2; stigmas 5-angled; ovules several–many. Fruit consisting of 1 or 2 pods. The flowers are very highly specialized for pollination by insects (see below, under *Asclepias*).

I. ASCLEPIODORA Gray.

Plants much like *Asclepias*, but the hoods without horns. Lobes of the corolla ascending or spreading.

1. A. viridis Gray. Green Milkweed. Stems about 1 ft. high, nearly smooth. Leaves alternate, short-petioled, oblong to ovate-lanceolate. Umbels clustered. Flowers about 1 in. in diameter, green with a purplish crown. In dry soil W. and S.

II. ASCLEPIAS L.

Perennial herbs. Flowers in simple (usually many-flowered) umbels. Calyx small, 5-parted, its lobes reflexed. Corolla deeply 5-parted, with reflexed lobes; crown of hoods and horns conspicuous (Fig. 27, *A*, *B*). Stamens with their filaments united into a tube around the pistil and anthers attached to the stigma (Fig. 27, *D*, *E*); anther cells 2, each cell containing an elongated, pear-shaped, tough mass of pollen, a mass from one anther always paired with one from the adjoining anther and each two together suspended from one of the 5 split glands on the angles of the stigma (Fig. 27, *D*, *E*). Ovaries 2; styles very short. Pods 2 or sometimes 1 and the other undeveloped. Seeds flat, each with a tuft of long, silky hairs. The flowers are pollinated by insects, which get their feet entangled in the clefts of the glands (Fig. 27, *g*) and then carry off the pollen masses.

1. A. tuberosa L. Butterfly Weed, Pleurisy Root. Stems roughish-hairy, 1–2 ft. high. Juice not milky. Leaves abundant, linear to lanceolate-oblong. Flowers showy, usually bright orange, in terminal cymose umbels. Horns nearly erect and slender. Pods nearly erect, covered with fine down. In dry fields.

2. A. decumbens L. Reclining Butterfly Weed. Much resembling *A. tuberosa*, but the stems reclining with the ends erect. Leaves elliptic or oblong. Umbels racemed along the branches. In dry soil.

3. A. purpurascens L. Purple Milkweed. Stem 1–3 ft. high, somewhat branched above. Leaves 4–6 in. long, elliptical or nearly so, the upper ones taper-pointed, slightly velvety beneath, short-petioled. Umbels terminal. Flowers $\frac{1}{2}$ in. long, dark purple; pedicels shorter than the peduncle; horn broadly scythe-shaped, with the point bent sharply inward. Dry soil.

4. A. syriaca L. Common Milkweed. Stem stout, 3–4 ft. high, finely downy. Leaves 4–8 in. long, oblong or nearly so, downy beneath. Umbels terminal or nearly so. Flowers varying from purple or greenish-purple to whitish, numerous, with a strong, sweet but sickening odor; hoods with a tooth on each side of the stout horn. Common in rich soil.

5. A. phytolaccoides Pursh. Poke-Leaved Milkweed. Stem rather slender, 3–5 ft. high. Leaves 6–9 in. long, ovate or oval-lanceolate, taper-pointed, short-petioled. Umbels several, mostly lateral; pedicels slender and drooping. Lobes of the corolla greenish; hoods white, with 2 teeth; horns with an awl-shaped point extending far out of the hoods. Damp thickets N. and E.

6. A. variegata L. White Milkweed. Stem stout, leafless and smooth below, leafy and downy in lines above. Leaves opposite, the middle ones sometimes in fours, petioled, ovate to obovate, cuspidate, smooth on both sides, pale beneath, edges slightly crenate. Umbels 1–5, compact, downy, 1–2 in. long; pedicels erect, as long as the peduncles. Corolla white, often purple at the base; hoods roundish, spreading, a little longer than the thick, awl-pointed, incurved horn. Dry, open woods E. and S.*

7. A. quadrifolia L. Four-Leaved Milkweed. Stem slender, $1\frac{1}{2}$–2 ft. or more high, usually leafless below. Leaves in 1 or 2 whorls of 4 each, near the middle of the stem, and a pair or two opposite, thin, slender-petioled, 2–4 in. long, ovate-lanceolate, taper-pointed. Umbels usually 2, sometimes 1, with slender pedicels. Corolla lobes very pale pink or whitish; hoods white; horn short, stout, and bent inward. Dry woods and fence rows.

III. HOYA R. Br.

Shrubby, more or less climbing, smooth, tropical plants. Leaves fleshy. Calyx 5-cleft; corolla 5-lobed, wheel-shaped, its divisions thick and with a waxy look; crown of 5 spreading segments; pollen masses fastened by the bases.

1. H. carnosa R. Br. Wax Plant. Stems long and slender, rooting and trailing. Leaves oval or nearly so, thick, dark green. Flowers in close umbels, pink or whitish, the corolla lobes covered on the upper surface with minute projections. Cultivated from India as a house plant and in conservatories.

83. CONVOLVULACEÆ. Morning-Glory Family

Usually twining herbs or shrubs, often with milky juice. Leaves alternate (wanting in *Cuscuta*), without stipules.

Flowers variously clustered, rarely solitary, often large and showy. Sepals 5. Corolla hypogynous, regular, tubular, bell-shaped or funnel-shaped; its limb more or less 5-lobed or angled. Stamens 5, inserted on the corolla tube. Ovary usually 2–4-celled; style slender, 2–4-cleft; ovules 1 or 2 in each cell. Capsule 1–4-celled, 2–4-valved, or bursting open across the base.

I. IMPOMŒA L.

Annuals or perennials; stems often twining. Flowers showy. Calyx not bracted at the base, of 5 sepals. Corolla bell-shaped or funnel-shaped, twisted in the bud. Stamens not projecting from the corolla. Style slender; stigma knobbed, 2-lobed. Fruit a 2–3-celled capsule. [*I. purpurea*, the common morning-glory, blossoms too late for school study. *I. Batatas*, the sweet potato, seldom flowers.]

B. Fl. species 1 (*Quamlocit*).

1. I. Quamlocit L. Cypress Vine. Stem slender, smooth, twining high. Leaves dark green, pinnately cut, the divisions linear, smooth. Peduncles slender, as long as the leaves, 1–5-flowered; pedicels thickened upward. Sepals ovate or oblong, mucronate. Corolla bright scarlet, or sometimes yellowish-white, salverform; the tube 1–1½ in. long; the limb flat and spreading, ½–¾ in. wide. Capsule ovoid, twice the length of the sepals. Common in gardens.*

2. I. hederacea Jacq. Wild Morning-Glory. Stems hairy, twining. Leaves heart-shaped, 3-lobed. Peduncles 1–3-flowered. Calyx very hairy below. Corolla showy, bluish-purple or white. Pod usually 3-celled, with 2 seeds in each cell. A weed in fields and about dwellings. Introduced from tropical America.

3. I. pandurata G. F. W. Mey. Wild Potato Vine. Perennial, from a very large, tuberous root; stem trailing or twining, smooth or slightly downy, 5–10 ft. long. Leaves broadly heart-shaped, with the apex slender and obtuse, sometimes fiddle-shaped or 3-lobed; petioles slender. Peduncles longer than the petioles, 1–5-flowered. Sepals oblong, obtuse, smooth, mucronate, the 2 outer ones shorter. Corolla white with a purple throat, 2–3 in. wide, lobes pointed. Capsule globose, 2–3-seeded, the seeds woolly on the angles. On dry or damp sandy soil, along fences, railroad embankments, etc.; common S. and W.*

4. I. leptophylla Torrey. Bush Morning-Glory. Perennial. Stems smooth, much branched, erect, ascending or reclining, 2–4 ft.

long, from a huge root. Leaves 2–5 in. long, short-petioled, linear, acute. Peduncles short, 1–4-flowered. Sepals broadly ovate, obtuse. Corolla pink or purple, funnel-shaped, about 3 in. long. Pod ovoid, 2-celled. Plains W. and S.W.

II. CONVOLVULUS L.

Herbs or shrubs, with stems twining or nearly erect. Calyx not bracted, or inclosed in 2 large, leaf-like bracts. Corolla broadly funnelform or bell-shaped. Stamens not projecting from the corolla. Style 1; stigmas 2; ovary and pod 1–2-celled, 4-seeded.

1. C. spithamæus L. Downy, stem 6–12 in. high, erect or reclining. Leaves oblong, sometimes heart-shaped or eared at the base. Flowers white. Calyx inclosed by 2 large, oval, acutish bracts. Stigmas stout. In sandy soil.

2. C. repens L. Trailing Bindweed. Stems downy, 1–3 ft. long, trailing or twining. Leaves sometimes heart-shaped, often narrowly arrow-shaped, with the lobes at the base obtuse or rounded. Peduncles 1-flowered. Corolla white, or sometimes pink. Stigma ellipsoidal. Bracts beneath the calyx 2, ovate. In fields.

3. C. sepium L. Creepers, Rutland Beauty. Stem twining or sometimes extensively trailing. Leaves heart-arrow-shaped or somewhat halberd-shaped, the lobes at the base truncate. Flowers numerous and showy, white or tinged with rose color. Bracts at the base of the flower large, ovate, heart-shaped. Thickets and banks of streams, often cultivated.

4. C. arvensis L. Bindweed. A perennial, prostrate or climbing herb, with many stems, from a long, slender rootstock. Leaves very variable, more or less arrow-shaped, 1–3 in. long. Peduncles mostly 1-flowered; flowers white or pinkish, about ¾ in. long. Calyx not bracted. Stigmas linear. A weed in fields E.; adventive from Europe.

84. POLEMONIACEÆ. Phlox Family

Annual or perennial herbs, rarely shrubs. Leaves alternate or the lower opposite, without stipules. Flowers in terminal, forking cymes. Calyx hypogynous, 5-lobed. Corolla regular or nearly so, 5-parted. Stamens 5, inserted on the corolla tube, usually unequal. Ovary 3-celled; style simple; stigmas 3, linear; capsule 3-celled, the cells 1–many-seeded.

I. PHLOX L.

Perennial or rarely annual herbs; stems erect or diffuse. Leaves opposite, or the upper alternate, entire, without stipules. Flowers showy, white or purple, in terminal cymes or panicles. Calyx cylindrical or funnelform, 5-cleft, the lobes acute. Corolla salver-form, the tube long and slender, the limb 5-parted, the lobes spreading, entire or obcordate. Stamens included, unequal. Ovary 3-celled, style slender. Capsule ovoid, 3-celled, 1–few-seeded; seeds wingless or narrow-winged.*

1. P. paniculata L. Garden Phlox. Perennial; stems in clumps, stout, erect, simple or branched above, 2–4 ft. high. Leaves ovate-lanceolate to oblong, taper-pointed at the apex, rounded or cordate at the base, thin, smooth; veins prominent beneath. Cymes numerous and compact, forming a pyramidal panicle; pedicels short. Calyx teeth long, bristle-pointed. Corolla purple to white; lobes round-obovate, shorter than the tube. Capsule longer than the calyx tube. In rich woods; often cultivated.*

2. P. maculata L. Wild Sweet William. Stem erect, smooth or nearly so, rather slender, purple-spotted, 1–2 ft. high. Lower leaves lanceolate, the upper ones broader, taper-pointed, roundish or heart-shaped at the base. Panicle many-flowered, narrow, ellipsoidal. Calyx teeth lanceolate, hardly acute. Flowers purple, occasionally white. Damp woods and fields.

3. P. glaberrima L. Smooth Phlox. Stems smooth, slender, erect, 1–3 ft. high. Leaves narrowly lanceolate or linear, 1½–4 in. long, smooth except the rough and sometimes recurved margins. Cymes few-flowered, grouped in loose corymbs. Calyx teeth very narrow and sharp-pointed. Corolla pink or whitish, lobes longer than the tube. Prairies and open woods.

4. P. pilosa L. Downy Phlox. Perennial; stem erect, slender, simple or branched, 1–2 ft. high. Leaves linear-lanceolate to linear, distant, spreading, long, taper-pointed, sessile; stem and leaves downy. Cymes corymbose, loose. Flowers short-pediceled. Calyx glandular-viscid, the teeth shorter than the tube of the purple corolla, bristle-pointed. Corolla tube downy, lobes obovate. Capsule twice the length of the calyx tube. In dry, open woods.*

5. P. divaricata L. Wild Blue Phlox. Perennial; stems erect or ascending from a decumbent base, sticky-downy, 1 ft. high. Leaves distant, lanceolate to oblong, acute at the apex, rounded at the base, sessile, downy. Cymes corymbed, loosely flowered. Calyx teeth awl-shaped, longer than the tube. Corolla bluish-purple, ½–¾

in. long; lobes notched at the apex, as long as the tube. Capsule oval, shorter than the calyx teeth. In moist, open woods.*

6. P. Drummondii Hook. DRUMMOND'S PHLOX. Annual; stem erect or ascending, slender, weak, branching, glandular-downy, 6–12 in. high. Leaves mostly alternate, lanceolate to oblong, downy, the upper clasping by a heart-shaped base. Corymbs loose. Flowers rather long-pediceled. Calyx tube short, the teeth lanceolate, bristle-pointed, soon recurved. Corolla purple to crimson or white; orifice of the tube usually with a white or yellowish star-like ring; lobes rounded at the apex. Ovary 3-seeded; angles of the seeds winged. Introduced from Texas and common everywhere in gardens.*

7. P. subulata L. GROUND PINK, MOSS PINK, FLOWERING MOSS. Stems perennial, prostrate, 8–18 in. long, with many short, somewhat upright branches, 2–4 in. high. Leaves linear-awl-shaped, stiff, about ½ in. long, crowded, with clusters of smaller ones in their axils. Flower clusters 3–6-flowered. Corolla pink-purple, with a darker center, or sometimes white. Forms dense mats on rocky or sandy hillsides. S. and W. and often cultivated.

II. POLEMONIUM L.

Perennial herbs. Leaves alternate, pinnate. Flowers in corymbs. Calyx bell-shaped, 5-lobed. Corolla wheel-shaped, the limb with 5 obovate lobes. Stamens borne on the throat of the corolla, the filaments enlarged and hairy below. Capsule ovoid, 3-celled, many-seeded.

1. P. reptans L. JACOB'S LADDER, BLUE VALERIAN, BLUEBELL. Stems smooth, branched, and leaning over, 6–12 in. high. Leaflets usually 7 or 9, about an inch long. Corolla blue, about 3 times as long as the calyx. Capsule 3-seeded, borne on a short stalk in the persistent calyx. Damp, open woods, sometimes cultivated.

85. HYDROPHYLLACEÆ. WATERLEAF FAMILY

Herbs, usually hairy. Leaves commonly alternate and alternate-lobed. Flowers with their parts in fives, in appearance not unlike those of the following family, in one-sided cymes, which are coiled up at first. Calyx free from the ovary, usually with appendages at the notches. Corolla often with scales or nectar-bearing folds inside. Stamens borne by the corolla tube. Style 2-cleft, or styles 2. Ovary entire and usually 1-celled. Fruit a capsule, 2-valved, 4–many-seeded.

I. HYDROPHYLLUM L.

Coarse perennials. Leaves large, petioled. Flowers white or pale blue, inconspicuous. Calyx 5-parted, sometimes appendaged at the notches. Corolla bell-shaped, 5-cleft, with 5 double, nectar-bearing folds inside. Stamens projecting, the filaments bearded. Style projecting; ovary covered with bristly hairs, the placentæ very broad and fleshy, inclosing the ovules. Capsule globular, 1–4-seeded.

1. H. macrophyllum Nutt. A coarse, rough-hairy plant, about 1 ft. high, from scaly-toothed rootstocks. Leaves oblong, pinnate and pinnately cut, the divisions mucronate, obtuse, coarsely toothed. Flower cluster dense, globular, long-peduncled. Flowers about ½ in. long. Calyx little or not at all appendaged, its lobes broad at the base, but with slender, tapering points. Corolla white. Rich, rocky woods W. and S.

2. H. virginianum L. Nearly smooth, 1–2 ft. high, stem often forking at the base. Leaves of the stem mostly near the top, pinnately cut into 5–7 divisions; lobes oval-lanceolate, deeply serrate, the lowest ones distinct; petioles of the basal and lower leaves 4–8 in. long. Flower clusters on peduncles longer than the petioles of the upper leaves, from the axils of which or opposite which they arise. Flowers about ½ in. long. Calyx not appendaged, its lobes narrowly linear, bristly-margined. Corolla whitish, with purplish veins. Moist woods.

3. H. appendiculatum Michx. Hairy, 1–1½ ft. high. Stem leaves palmately 5-lobed, the lobes acute, toothed, lowest ones pinnately divided. Flower cluster rather loose. Calyx appendaged at the notches. Corolla blue. Stamens projecting from the corolla little or not at all. Moist woods.

II. ELLISIA L. (MACROCALYX)

Delicate, branching annuals. Leaves pinnately lobed or divided. Flowers small, whitish. Calyx without appendages, 5-parted, enlarged and leafy in fruit. Corolla bell-shaped or cylindrical, little if any longer than the calyx, 5-lobed, with 5 minute appendages within the tube. Placentæ, fruit, and seeds nearly as in *Hydrophyllum*.

1. E. Nyctelea L. Plant somewhat roughish-hairy, 6–12 in. high. Leaves pinnately parted or divided. Peduncles 1-flowered, opposite the leaves. Corolla whitish. Pod globose, finally pendulous. In damp, shady places.

III. PHACELIA Juss.

Herbs, mostly annual. Leaves alternate, sometimes simple, but in most species lobed or divided. Flowers in one-sided clusters, often showy. Calyx 5-parted, without appendages. Corolla with 5 spreading lobes. Ovary 1-celled, with narrow placentæ.

1. **P. bipinnatifida** Michx. A hairy biennial. Stem upright, 1–2 ft. high. Leaves on long petioles, pinnately divided or deeply cut into 3–7 toothed or cut segments. Racemes long, loose, many-flowered. Flowers blue or violet, the spreading or recurved pedicels about as long as the calyx. Calyx segments linear. Corolla broadly bell-shaped, its appendages in pairs between the stamens. Rich soil in thickets and along streams.

2. **P. tanacetifolia** Benth. A tall, hairy annual. Leaves pinnately cut. Spikes long, densely flowered. Flowers showy, blue. Stamens projecting. Capsule 4-seeded. Cultivated from California.

3. **P. Whitlavia** Gray. WHITLAVIA. A rather coarse, sticky annual. Leaves broad, ovate, coarsely toothed, petioled. Flower clusters a loose raceme. Flowers showy, about 1 in. long, blue or sometimes white. Corolla bell-shaped. Stamens and style projecting. Capsule many-seeded. Cultivated from California.

4. **P. linearis** Holz. EUTOCA. A much-branched, somewhat rough or rough-hairy plant, 3–12 in. high. Leaves linear or lanceolate, entire or nearly so. Flowers showy, violet or white, loosely panicled. Capsule many-seeded. Cultivated from California.

86. BORAGINACEÆ. BORAGE FAMILY

Mostly herbs, with stems and foliage roughened with stiff hairs. Leaves alternate and entire, not aromatic. Flowers generally in a coiled inflorescence. Calyx 5-parted. Corolla hypogynous, generally 5-lobed and regular. Stamens 5, inserted on the corolla tube. Style 1; ovary commonly 4-lobed, ripening into 4 1-seeded nutlets.

I. HELIOTROPIUM L.

Herbs or low shrubs. Leaves petioled. Flowers white, blue, or lilac, in one-sided, curved spikes. Calyx 5-parted. Corolla salver-shaped, the throat open. Anthers almost sessile. Style short; stigma conical or knobbed. Fruit separating into 2 or 4 nutlets.

1. **H. peruvianum** L. Common Heliotrope. Somewhat shrubby, much branched. Leaves lance-ovate or somewhat oblong, veined and much wrinkled, short-petioled. Flowers numerous, in a cluster of terminal spikes, bluish-purple or lavender, very sweet-scented, the odor not unlike that of vanilla. Cultivated from Peru.

II. CYNOGLOSSUM L.

Coarse, rough-hairy or silky biennials. Flowers small, bluish-purple or white, in forked and usually bractless cymes. Calyx 5-parted. Corolla funnel-shaped, the mouth closed by prominent scales, its lobes obtuse. Stamens not projecting. Styles stiff, persistent. Nutlets 4, covered with hooked or barbed bristles, attached to a thickened, conical receptacle.

1. **C. officinale** L. Hound's-Tongue, Sheep Lice, Dog Bur, Stick-Tights. Stem 1–2 ft. high, soft-downy, panicled above. Basal leaves 8–10 in. long, long-petioled, oblong or oblong-lanceolate; stem leaves sessile, linear-oblong or lanceolate, rounded or heart-shaped at the base. Corolla ½ in. in diameter, reddish-purple. Nutlets ¼ in. long, with a thickened border. Whole plant with a strong smell like that of mice. A troublesome weed; along roadsides and in pastures; naturalized from Europe.

2. **C. virginianum** L. Wild Comfrey. Perennial. Stem stout, simple, erect, leafless above, 2–3 ft. high. Leaves oval or oblong, the upper clasping by a heart-shaped base. Racemes bractless; flowers pale blue, on short pedicels, which are recurved in fruit. Nutlets not margined, separating and falling away at maturity. On dry soil.

III. LAPPULA Moench.

Annual or biennial herbs, grayish, with rough hairs. Flowers small, blue or whitish, racemed or spiked. Corolla salver-shaped, its throat closed with 5 concave scales. Nutlets more or less covered with prickles, which are barbed at the tip, attached by their sides to the base of the style.

1. **L. virginiana** Greene. Beggar's Lice. A coarse biennial, 2–4 ft. high, the stem much branched above. Basal leaves roundish-ovate or heart-shaped, on slender petioles; stem leaves 3–4 in. long, pointed at both ends. Racemes 1–3 in. long, terminating the slender, spreading branches; flowers small, bluish-white. Fruit forming a troublesome bur. Fence rows and thickets.

IV. MYOSOTIS L.

Low, annual, biennial, or perennial herbs; stems branching, erect, or diffuse. Leaves alternate, entire. Flowers small, blue, pink, or white, in elongated, bractless racemes. Calyx 5-cleft, the lobes erect or spreading in fruit. Corolla salverform, 5-lobed, the tube as long as the calyx, the throat with 5 small appendages. Stamens 5, inserted in the tube of the corolla, included. Ovary 4-parted; style slender. Nutlets smooth or downy, elliptical, compressed.*

1. **M. scorpioides** L. Forget-Me-Not. Perennial, from slender rootstocks; stems slender, downy, rooting at the nodes, 6–15 in. long. Leaves oblong to oblong-lanceolate, obtuse, narrowed to the sessile base, appressed-downy. Racemes many-flowered; pedicels becoming elongated in fruit. Lobes of the calyx shorter than the tube, spreading in fruit. Corolla blue, with a yellow eye. Nutlets angled, smooth. In gardens and often naturalized from Europe.*

2. **M. laxa** Lehm. Small Forget-Me-Not. Annual or perennial; whole plant downy; stem slender, weak, decumbent and rooting at the base, 1–2 ft. long. Lower leaves spatulate, the upper lanceolate. Racemes loosely flowered, becoming elongated in fruit; pedicels spreading. Calyx rough-hairy, the lobes as long as the tube. Corolla pale blue, with a yellow eye. Nutlets convex on all sides. On low ground and in brooks and ponds.*

V. MERTENSIA Roth.

Perennial herbs. Leaves generally pale, smooth, and entire. Calyx short, deeply 5-cleft or 5-parted. Corolla somewhat trumpet-shaped or funnel-shaped, often with 5 small folds or ridges in the throat, between the points of insertion of the stamens. Style long and slender. Nutlets smooth, or at length becoming wrinkled.

1. **M. virginica** Link. Lungwort, Bluebells. Smooth, nearly erect, 1–1½ ft. high. Basal leaves large, obovate or nearly so, and petioled; stem leaves smaller, sessile. Flowers clustered. Corolla nearly trumpet-shaped, varying with age from lilac to blue (or occasionally white). Stamens with slender filaments projecting beyond the corolla tube. Damp, open woods, and banks of streams; sometimes cultivated.

VI. LITHOSPERMUM L.

Herbs, with stout, usually reddish roots. Flowers appearing axillary and solitary or else in leafy-bracted spikes. Corolla funnel-shaped or salver-shaped, with or without folds or appendages at the mouth of the tube; the limb 5-cleft, its divisions rounded. Stamens included in the corolla tube, the anthers nearly sessile. Nutlets either smooth or wrinkled, generally very hard and bony.

1. L. arvense L. Corn Gromwell. A rough weed, about 1 ft. high. Leaves narrowly lanceolate. Flowers inconspicuous, whitish, in the upper leaf axils. Corolla hardly extending beyond the calyx, without appendages in the throat. Nutlets rough or wrinkled and dull. Sandy banks and roadsides; naturalized from Europe.

2. L. Gmelini Hitchc. Hairy Puccoon. Rough-hairy, perennial, 1–2 ft. high. Corolla deep orange-yellow, with appendages in the throat and clad with wool within at the bottom; flowers handsome, peduncled, in a crowded cluster. Dry, open pine woods, in sandy soil.

3. L. canescens Lehm. Puccoon, Indian Paint. Perennial; clothed with soft hairs, 8–12 in. high. Flowers axillary and sessile. Corolla appendaged, not woolly within, showy, orange-yellow. Banks and open woods.

4. L. angustifolium Michx. Narrow-Leaved Puccoon. Perennial; rough, 6–18 in. high, from a deep root. Leaves linear, sessile, acute or nearly so. Flowers pediceled in terminal leafy racemes of two kinds, the earlier showy, bright yellow, with a corolla tube an inch or more long; the latter much smaller, pale yellow, cleistogamous, fruiting abundantly. Pedicels of the cleistogamous flowers at length recurved. Nutlets ovoid, white, very smooth, slightly pitted. In dry soil W.

VII. ONOSMODIUM Michx.

Mostly rough-hairy perennial herbs. Leaves sessile, entire, with prominent veins. Flowers rather small, white, greenish or yellowish, in leafy one-sided spikes or racemes. Calyx 5-parted into linear divisions. Corolla tubular or tubular-funnelform, with 5 acute erect lobes. Stamens 5, perigynous, not projecting from the corolla tube. Style thread-like, decidedly projecting. Nutlets usually only 1 or 2, white, smooth and shining.

1. O. virginianum A.DC. Stems rather slender, 1–3 ft. high, covered with rough, stiff bristles. Leaves oblong or oblong-lanceolate,

the lower ones narrowed at the base. Corolla narrow, its lobes lance-awl-shaped, slightly bearded outside with long bristles. In dry thickets or on hillsides.

2. O. hispidissimum Mackenzie. Stem stout, upright, 1–4 ft. high, shaggy with long bristly hairs. Leaves from lanceolate to oblong, acute, 2–4½ in. long. Corolla rather broad, its lobes ovate-triangular or triangular-lanceolate, thickly hairy outside. Nutlets with a very short neck at the base. Rich soil along river banks and bottom lands.

VIII. ECHIUM L.

Herbs or sometimes shrubs, usually stout, coarse, and hairy. Leaves entire. Flowers white, reddish-purple or blue, in spiked or panicled racemes. Calyx 5-parted. Corolla tube cylindrical or funnel-shaped; the throat dilated; the limb with 5 unequal lobes. Filaments unequal, attached to the corolla below, projecting from the corolla. Style thread-like; stigma 2-lobed. Nutlets 4, ovoid or top-shaped, wrinkled.

1. E. vulgare L. Blue Thistle, Blue Weed, Blue Devils. Stems 1–3 ft. high, more or less erect, leafy, covered with stinging hairs. Root leaves lanceolate or oblong, petioled, 4–8 in. long; stem leaves sessile, acute, rounded at the base. Flowers showy, reddish-purple in the bud, changing to bright blue. A very troublesome weed, especially in fallow fields. Naturalized from Europe.

87. VERBENACEÆ. Verbena Family

Herbs, shrubs, or trees. Leaves opposite or whorled, without stipules. Flowers zygomorphic, in bracted cymes. Calyx hypogynous, cleft or toothed. Corolla hypogynous, tubular, usually more or less 2-lipped. Stamens usually 4 (2 long and 2 short), inserted on the corolla tube. Ovary usually 2–4-celled (in *Phryma* 1-celled), with the style springing from its summit.

I. VERBENA L.

Annual or perennial herbs. Leaves simple, opposite, serrate or pinnately lobed. Flowers in terminal spikes which become much elongated in fruit. Calyx tubular, 5-ribbed, 5-toothed. Corolla salverform or funnelform, the tube often curved, bearded in the throat, limb spreading, 5-lobed, often

somewhat 2-lipped. Stamens 4 (2 long and 2 short), rarely only 2, included. Ovary 2–4-celled, 2–4-ovuled; style slender, 2-lobed. Fruit 2–4 smooth or roughened, 1-seeded nutlets. [Several of the commonest species are tall, coarse herbs, which blossom too late for school study.]*

1. V. officinalis L. European Vervain. Annual; stem erect, slender, nearly or quite smooth, branching, 1–3 ft. high. Leaves ovate to obovate in outline, pinnately lobed or divided, narrowed and entire toward the base, downy beneath; petioles margined. Spikes several, very slender; flowers small, purple; bracts shorter than the calyx. In fields and waste places. Naturalized from Europe.*

2. V. angustifolia Michx. Narrow-Leaved Vervain. Perennial, rough-hairy; stem simple, or branched below, from a creeping base, 1–2 ft. high. Leaves lanceolate to spatulate, obtuse and toothed at the apex, tapering to a sessile base. Spike peduncled, slender, close-flowered; bracts about the length of the calyx. Corolla purple, tube slightly curved, ¼ in. long. In dry, open woods.*

3. V. bracteosa Michx. Perennial; widely spreading or decumbent, hairy; stems 6–15 in. long, 4-sided, branching from the base. Leaves wedge-lanceolate, 3-cleft or pinnately cut, short-petioled. Spikes sessile, stout, with large bracts, the lower ones pinnately cut and longer than the flowers. Flowers small, purple. On prairies and waste ground.

4. V. bipinnatifida Nutt. Perennial; plant rough-hairy, producing suckers, erect, 6–18 in. high. Leaves with petioles, or the upper ones sessile, once or twice pinnately parted into oblong or linear divisions. Spikes stout, dense and solitary at the ends of the branches; bracts usually longer than the calyx. Corolla bluish-purple or lilac, less than ½ in. in diameter. Dry plains and prairies W. and S.

5. V. canadensis Britton. Wild Verbena. A slender-stemmed, somewhat reclining annual, 1 ft. or less in height. Leaves ovate or nearly so, wedge-shaped at the base, lobed and toothed or 3-cleft. Flowers showy, reddish-purple or lilac (seldom white), in a peduncled spike. Calyx teeth as long as or longer than the bracts. Corolla very slightly bearded in the throat. In dry prairie soil and open woods; also cultivated. [Other somewhat similar cultivated species are from Brazil.]

II. CALLICARPA L.

Shrubs. Leaves simple, petioled, opposite or whorled, glandular-dotted. Flowers in axillary cymes. Calyx 4-toothed or entire. Corolla funnelform, 4-cleft, actinomorphic. Stamens 4, equal, projecting. Ovary 4-ovuled; style slender; stigma knobbed. Fruit a 1–4-seeded berry.*

1. **C. americana** L. French Mulberry, Mexican Mulberry. Shrubs, with star-shaped glandular or scurfy down, widely branched, 3–8 ft. high. Leaves ovate to oblong, acute at each end, crenate-serrate, rough above, downy beneath, glandular-dotted; petioles slender. Cymes many-flowered, the peduncle as long as the petiole; pedicels short. Calyx cup-shaped, the teeth short. Corolla double the length of the calyx, blue. Fruit violet-purple, very conspicuous in autumn. Common in fields and thickets S.*

88. LABIATÆ. Mint Family

Mostly herbs, with square stems and opposite, more or less aromatic, leaves, without stipules. Flowers generally in cyme-like axillary clusters, which are often grouped into terminal spikes or racemes. Calyx tubular, usually 2-lipped, persistent. Corolla usually 2-lipped. Stamens 4 (2 long and 2 short) or only 2. Ovary free, with 4 deep lobes, which surround the base of the style. Fruit consisting of 4 nutlets, ripening inside the base of the calyx.

A

Stamens 4.

(*a*) Calyx 2-lipped.

Lips entire. Scutellaria, I

Lips toothed and cleft. Plants not aromatic. Prunella, IV

Lips toothed and cleft. Plants aromatic. Leaves extremely small. Thymus, IX

(*b*) Calyx not 2-lipped, or not much so.

Calyx tubular, 5–10-toothed. Stamens not projecting from tube of corolla. Marrubium, II

Calyx tubular, with 5 equal teeth. Stamens under upper lip of corolla. Nepeta, III

Calyx tubular, bell-shaped, with 5 awl-shaped teeth. Stamens not turned down after maturing. Lamium, V

Calyx top-shaped, with spreading spiny teeth. Leonurus, VI

Calyx as in V. Stamens turned down after maturing. Stachys, VII

B

Stamens 2. Salvia, VIII

I. SCUTELLARIA L.

Mostly slender herbs, not aromatic. Flowers solitary or in pairs, axillary or in terminal spikes or racemes. Calyx bell-shaped, 2-lipped, the upper part swollen into a helmet-shaped pouch; mouth of the calyx closed after flowering. Corolla tube long, naked inside. Stamens 4, the anthers meeting in pairs, hairy-fringed. Style with a very short upper lobe. [The species here described are not the commonest ones, but most of the others grow in damp soil and bloom later.]

1. S. serrata Andr. Skullcap. Stem not much branched, 1–3 ft. high. Stem leaves serrate, taper-pointed at both ends, ovate or nearly so. Racemes single, loose. Calyx rather hairy. Corolla 1 in. long, the lips of equal length. Woods.

2. S. pilosa Michx. Hairy Skullcap. Stem more or less hairy, not much if at all branched, 1–3 ft. high. Leaves a few distant pairs, diamond-ovate, oblong-ovate, or roundish-ovate, scalloped, obtuse, the lower heart-shaped or nearly truncate at the base, with long petioles. Racemes short, few-flowered. Corolla $\frac{1}{2}$ in. long; tube whitish, lips blue, the lower one rather shorter. Open woodlands and dry soil.

3. S. integrifolia L. Large-Flowered Skullcap. Stem covered with fine, grayish down, usually unbranched, 1–2 ft. high. Leaves lance-oblong or nearly linear, mostly entire, obtuse, with very short petioles. Corolla 1 in. long, tube pale, lips large and spreading, blue. Dry ground.

4. S. parvula Michx. Small Skullcap. Perennial with necklace-like tuber-bearing rootstocks. Stems slender, minutely downy, 3–12 in. long, erect or spreading. Leaves varying from ovate to lanceolate, or the lower nearly round. Flowers solitary in the axils of the upper leaves. Corolla $\frac{1}{6}$–$\frac{1}{3}$ in. long, violet, downy. In moist, sandy soil.

II. MARRUBIUM L.

Perennial, downy, or woolly herbs. Whorls of flowers axillary; flowers small; bracts leaf-like. Calyx tubular, 5–10-toothed; teeth somewhat spiny. Corolla short; upper lip erect, lower spreading, 3-cleft, the middle lobe broadest. Stamens 4, not projecting. Lobes of the stigma short and blunt.

1. M. vulgare L. Horehound. Stems somewhat reclining, stout, branching, leafy, 1–1½ ft. high. Leaves broadly ovate, heart-shaped or wedge-shaped at the base, scalloped, leathery and wrinkled. Whorls

of flowers dense. Calyx teeth hooked at the tip. Corolla ½ in. long, white. Cultivated from Europe as an herb (used in preparation of horehound candy) and somewhat naturalized.

III. NEPETA L.

Erect or prostrate herbs. Whorls of flowers axillary or terminal; flowers blue or white. Calyx tubular, 15-ribbed, 5-toothed. Corolla tube slender below, dilated at the throat, naked; upper lip notched or 2-cleft; lower lip 3-cleft, middle lobe large. Stamens 4, ascending under the upper lip, the upper pair longer. Lobes of the stigma awl-shaped.

B. Fl. species 2 (*Glecoma*).

1. N. Cataria L. Catnip. Stem grayish, downy, 2–3 ft. high, branched, very leafy. Leaves large, ovate-heart-shaped, deeply scalloped, serrate, white and downy beneath. Corolla about ½ in. long, whitish with purple dots. Naturalized from Europe; a common weed about dooryards.

2. N. hederacea Trevisan. Ground Ivy, Gill-over-the-Ground, Creeping Charley, Crow Victuals, Robin Runaway. Creeping. Leaves roundish, kidney-shaped, and crenate. Corolla bluish-purple, three times as long as the calyx. Common in damp places about houses and gardens. Naturalized from Europe.

IV. PRUNELLA L.

Perennials, with stems simple or nearly so, and sessile, 3-flowered flower clusters in the axils of kidney-shaped bracts, the whole forming a spike or head. Calyx tubular-bell-shaped, somewhat 10-ribbed; upper lip broad, 3-toothed, the teeth short; lower lip with 2 longer teeth. Upper lip of the corolla upright, arched, and entire; the lower spreading, reflexed, fringed, and 3-cleft. Stamens 4, reaching up under the upper lip, with the tips of the filaments 2-toothed; only one tooth anther-bearing.

1. P. vulgaris L. Self-Heal, Healall, Carpenter Weed. Leaves with petioles, ovate-oblong, either entire or toothed, often somewhat hairy. Corolla usually blue or bluish, somewhat longer than the brown-purple calyx. Open woods and fields everywhere.

V. LAMIUM L.

Annual or perennial hairy herbs. Calyx tubular-bell-shaped, 5-veined, with 5 awl-pointed teeth of nearly equal length.

Corolla with dilated throat, upper lip arched, middle lobe of the lower lip notched, the lateral lobes small, close to the throat of the corolla. Stamens 4, rising beneath the upper lip.

1. L. amplexicaule L. Henbit, Dead Nettle. An annual or biennial weed. Leaves roundish, deeply scalloped, the lower ones petioled, the upper sessile and clasping. Corolla sometimes ¼ in. long, downy, rose-colored or purplish. Not uncommon about gardens and dooryards. Naturalized from Europe.

2. L. purpureum L. Stem 6–18 in. high, silky-hairy or nearly smooth, reclining below, branched from the base. Leaves long-petioled, obtuse, heart-shaped, scalloped. Whorls of flowers mostly terminal, crowded. Corolla ½–¾ in. long, purple (rarely white). Naturalized from Europe.

VI. LEONURUS L.

Erect herbs. Leaves lobed. Whorls of flowers axillary, densely flowered, scattered; bractlets awl-shaped; flowers small, pink or white. Calyx 5-nerved, top-shaped, with 5 rather spiny, spreading teeth. Corolla with upper lip erect and entire, lower 3-cleft. Stamens 4; anthers joined in pairs. Nutlets with 3 projecting angles, their sides channeled.

1. L. cardiaca L. Motherwort. Stem 2–4 ft. high, prominently angled, stiff, stout, upright, very leafy. Leaves palmately lobed or cleft; basal ones long-petioled; lower stem leaves many-cleft, the upper ones 3-cleft, prominently nerved, the divisions acute. Corolla ½ in. long, pale rose color, the upper lip and outside of the tube densely soft-bearded. Common about dooryards and fence rows. Naturalized from Europe.

VII. STACHYS L.

Herbs, rarely shrubs. Leaves scalloped or serrate. Whorls of flowers 2 or more flowered, usually in terminal racemes. Calyx nearly bell-shaped, 5-toothed. Corolla tube cylindrical, usually with a ring of hairs inside, not dilated at the throat; upper lip erect or spreading; lower spreading, 3-lobed, the middle lobe largest. Stamens 4, the 2 lower longest.

1. S. palustris L. Perennial; stem erect, 4-angled, 2–3 ft. high, hairy, especially on the angles, with projecting or reflexed hairs, leafy. Stem leaves short-petioled or sessile, ovate-lanceolate or oblong-lanceolate, scalloped-serrate, coarsely or finely downy, roundish

at the base, rather obtuse at the tip. Calyx bristly, the lance-awl-shaped teeth rather spiny. Upper lip of the corolla downy. In wet soil, especially N.

2. S. tenuifolia Willd., var. aspera. Taller than No. 1; angles of the stem covered with stiff reflexed bristles, but the sides often smooth. Leaves serrate, nearly all with distinct petioles. Calyx usually smooth. Corolla smooth throughout. Damp thickets and along streams.

VIII. SALVIA L.

Annual, biennial, or perennial herbs, or sometimes shrubby. Flowers in spikes, racemes, or panicles, usually showy. Calyx tubular or bell-shaped, not bearded in the throat, 2-lipped, the upper lip entire or 3-toothed, the lower 2-cleft. Corolla 2-lipped; the upper lip entire or notched, the lower spreading, 3-lobed, with the middle lobe longer. Stamens 2, short; anthers 2-celled, the upper cell fertile, the lower imperfect. Style 2-cleft. Nutlets smooth.*

1. S. lyrata L. Lyre-Leaved Salvia. Biennial or perennial; stem erect, sparingly branched above, rough-hairy, 1–2 ft. high. Leaves mostly basal, spreading, lyrate-pinnatifid, usually purple; stem leaves small, sessile or short-petioled. Racemes many-flowered, whorls about 6-flowered. Calyx teeth short on the upper lip, long and awl-shaped on the lower. Corolla blue or purple; the tube about 1 in. long, dilated upward. On dry soil.*

2. S. officinalis L. Garden Sage. Stem shrubby, slender, much branched below, 1 ft. high. Leaves grayish-green, lance-oblong, crenate, wrinkled. Flowers in terminal spikes, whorls several-flowered. Corolla blue, upper lip strongly arched, about equaling the lower. A common garden herb. Cultivated from Europe.*

IX. THYMUS L.

Small, much-branched shrubs, very aromatic. Leaves small, entire, margins often rolled under. Whorls of flowers few-flowered, in loose or close spikes; bracts very small; flowers usually purple. Calyx ovoid, 2-lipped; upper lip 3-toothed; lower 2-cleft, woolly in the throat. Corolla slightly 2-lipped. Stamens 4, usually projecting from the flower, straight; lower pair longer.

1. T. Serpyllum L. Creeping Thyme. Smooth or hairy, stem prostrate, the flowering branches somewhat ascending. Leaves $\frac{1}{8}$–$\frac{1}{4}$

in. long, flat, ovate or obovate-lanceolate, obtuse. Flowers crowded in spikes at the end of the branches. Corolla rose-purple, $\frac{1}{4}$–$\frac{3}{4}$ in. long. Naturalized from Europe.

2. T. vulgaris L. Garden Thyme. More erect than No. 1. Leaves somewhat curled under at the edges. Flower clusters shorter and not all terminal. Corolla pale purple. Cultivated from Europe as an herb.

89. SOLANACEÆ. Nightshade Family

Mostly tropical herbs or shrubs (rarely trees). Leaves usually alternate, without stipules. Flowers actinomorphic, borne on bractless pedicels at or above the leaf axils, or in cymes. Calyx hypogynous, 5-cleft, usually persistent. Corolla hypogynous, wheel-shaped, bell-shaped, or salver-shaped, 5-lobed. Stamens 5, short, inserted on the corolla tube. Ovary 2-celled or imperfectly 4-celled; style simple; stigma simple or lobed. Fruit a many-seeded capsule or berry.

I. SOLANUM L.

Herbs or shrubs; stems often prickly, sometimes climbing. Leaves alternate, often nearly or quite opposite. Flowers clustered, the peduncles often opposite or above the axils. Calyx spreading, 5-toothed or 5-cleft, persistent. Corolla wheel-shaped, 5-lobed. Stamens 5, projecting, the filaments very short, the anthers long and meeting about the style. Ovary 2-celled; style slender. Fruit a many-seeded, juicy berry.*

1. S. Dulcamara L. Bittersweet. Perennial; stems rather shrubby, long, and climbing. Leaves heart-shaped, or some of them with irregular lobes, or ear-like leaflets at the base. Flowers blue or purple, somewhat cymose. Berries showy, of many shades of orange and red in the same cluster, according to their maturity. Naturalized from Europe.

2. S. nigrum L. Nightshade. Annual; stem smooth, or downy with simple hairs, erect, diffusely branched; branches wing-angled, 1–3 ft. high. Leaves ovate, irregularly toothed or entire, somewhat inequilateral, petioled. Flowers in lateral, peduncled umbels, small, white, drooping. Calyx lobes obtuse; corolla $\frac{1}{3}$–$\frac{1}{2}$ in. wide; filaments downy; berries globose, smooth, black when ripe. Common in cultivated fields and waste places.*

3. S. carolinense L. HORSE NETTLE. Perennial; stem erect, branched, downy with star-shaped hairs, armed with straight yellow prickles, 1–3 ft. high. Leaves ovate-oblong, deeply toothed or lobed, acute at the apex, abruptly contracted to the short petiole, prickly on the veins. Racemes lateral, few-flowered; pedicels recurved in fruit. Calyx lobes taper-pointed. Corolla deeply angular-lobed, blue or white; berry globose, smooth, yellow. A common weed.*

4. S. rostratum Dunal. SAND BUR, BUFFALO BUR. Annual; the whole plant beset with yellow prickles; stem erect, diffusely branched, 1–2 ft. high. Leaves broadly oval or ovate in outline, deeply pinnately lobed or parted, petioled, downy with star-shaped hairs. Racemes few-flowered; pedicels erect in fruit. Calyx very prickly, becoming enlarged and inclosing the fruit. Corolla bright yellow, 5-angled, about 1 in. broad. From the West, becoming a troublesome weed in some places.*

5. S. tuberosum L. IRISH POTATO. Annual; stem diffusely branched, downy, underground branches numerous and tuber-bearing. Leaves irregularly pinnatifid and divided. Flowers in cymose clusters, white or purple, with prominent yellow anthers; pedicels jointed. Corolla 5-angled, $\frac{3}{4}$–1 in. broad. Fruit a globose, greenish-yellow, many-seeded berry, about $\frac{1}{2}$ in. in diameter. Cultivated from Chile.*

II. LYCOPERSICUM Hill.

Annual; stem diffusely branched. Leaves pinnately divided. Flowers in raceme-like clusters on peduncles opposite the leaves. Calyx 5–many-parted, persistent. Corolla wheel-shaped, 5–6-parted. Stamens 5–6, inserted in the short tube of the corolla; filaments short, anthers elongated. Ovary 2–several-celled; style and stigma simple. Fruit a many-seeded berry.*

1. L. esculentum Mill. TOMATO. Stem diffusely branched, at length leaning over, furrowed and angled below, sticky-hairy, 3–5 ft. long. Leaves irregularly lobed and pinnatifid, petioled. Calyx lobes linear, about as long as the yellow corolla. Fruit (in the wild state) globose or ovoid, red or yellow, $\frac{1}{4}$–$\frac{1}{2}$ in. in diameter, but greatly enlarged in cultivation. Common in cultivation from tropical America.*

III. LYCIUM L.

Shrubs or woody vines, often spiny. Leaves entire, alternate, often fascicled. Flowers solitary or clustered, terminal

or axillary. Calyx persistent, 4–5-lobed or toothed, not enlarged in fruit. Corolla funnelform or bell-shaped, the limb 4–5-lobed, the lobes obtuse. Stamens 4–5, projecting. Ovary 2-celled; style single; stigma obtuse. Fruit a many-seeded berry.*

1. L. halimifolium Mill. MATRIMONY VINE. Stem slender, branching, twining or trailing, 6–15 ft. long; branches angled, spiny. Leaves elliptical, smooth, entire, sessile or short-petioled. Flowers solitary or few in the axils; peduncles long and slender. Corolla spreading, greenish-purple, $\frac{1}{3}$–$\frac{1}{2}$ in. wide. Berry oval, orange-red. Introduced from Africa, and often planted for covering trellises.*

IV. DATURA L.

Annual or perennial, strong-scented herbs; stems tall and branching. Leaves petioled, entire or lobed. Flowers large, solitary in the forks of the branches. Calyx tubular, 5-toothed or lobed, the upper part deciduous and the lower persistent. Corolla funnelform, 5-angled. Stamens 5, inserted in the corolla tube. Ovary 2-celled or imperfectly 4-celled; style filiform; stigma 2-lobed. Fruit a spiny, 4-valved, many-seeded capsule.*

1. D. Stramonium L. JIMSON WEED. Annual; stem smooth, green, stout, forking above, 1–4 ft. high. Leaves ovate to oblong-ovate, acute at the apex, narrowed at the base, sinuate-toothed, petioled. Calyx 5-angled. Corolla white, about 4 in. long. Capsule ovoid, erect, 2 in. long. A common weed; poisonous. Naturalized from Asia (?).*

2. D. Tatula L. Taller, with a purple stem; flowers rather later than No. 1. Corolla violet-tinged. Naturalized from tropical America.

V. PETUNIA Juss.

Herbs; leaves alternate and entire. Divisions of the calyx oblong-spatulate. Corolla showy, spreading, funnel-shaped, not perfectly actinomorphic. Stamens 5, somewhat unequal in length, inserted in the middle of the corolla tube and not projecting beyond it. Capsule 2-celled, containing many very small seeds.

1. P. violacea Lindl. COMMON PETUNIA. Stems rather weak and reclining. Leaves covered with clammy down. Corolla varying from pale pink to bright purplish-red, often variegated, with a broad, inflated tube, which is hardly twice as long as the calyx. Cultivated annual from South America.

2. P. nyctaginiflora Juss. WHITE PETÚNIA. Leaves somewhat petioled. Tube of corolla long and slender. Flowers white. Cultivated from South America. This and the preceding species much mixed by hybridization.

90. SCROPHULARIACEÆ. FIGWORT FAMILY

Mostly herbs, with flowers not actinomorphic. Calyx free from the ovary and persistent. Corolla often 2-lipped. Stamens usually 2 long and 2 short, or only 2 in all, inserted on the corolla tube, often 1 or 3 of them imperfectly developed. Pistil consisting of a 2-celled and usually many-ovuled ovary, with a single style and an entire or 2-lobed stigma.

Corolla wheel-shaped, stamens 5. Verbascum, I
Corolla wheel-shaped or salver-shaped, nearly actinomorphic, stamens 2. Veronica, VI
Corolla 2-lipped, the mouth closed by a palate, tubular below, a spur at the base. Linaria, II
Corolla 2-lipped, the mouth closed by a palate, tubular below, a short, broad pouch at the base. Antirrhinum, III
Corolla decidedly 2-lipped.
Stamens with anthers 2. Gratiola, V
Stamens 4, with a fifth antherless filament. Pentstemon, IV
Stamens 4, the anther cells unequal. Castilleja, VII
Stamens 4, the anther cells equal. Pedicularis, VIII

I. VERBASCUM L.

Biennial; stem tall, erect. Leaves alternate. Flowers in spikes, racemes, or panicles. Calyx deeply 5-cleft. Corolla wheel-shaped, 5-lobed, the lobes nearly equal. Stamens 5, unequal, declined; some or all of the filaments bearded. Style flattened at the apex. Fruit a globose capsule; seeds roughened.*

1. V. Blattaria L. MOTH MULLEIN. Stem erect, slender, simple or sparingly branched, smooth below, downy above, 2–4 ft. high. Leaves oblong to lanceolate, acute at the apex, obtuse or truncate at the base, dentate to pinnately lobed, the lower petioled, the upper

sessile and clasping. Raceme long and loose, glandular-downy; pedicels bracted. Corolla white or yellow, marked with brown on the back, about 1 in. wide. Filaments all bearded with purple hairs. Capsule longer than the calyx. Common in fields and waste places. Naturalized from Europe.*

II. LINARIA Hill

Herbs, rarely shrubby. Lower leaves opposite, whorled or alternate. Flowers in bracted racemes or spikes, or axillary and solitary. Calyx 5-parted. Corolla 2-lipped, the tube spurred. Stamens 4, with sometimes a rudiment of a fifth. Stigma notched or 2-lobed. Capsule ovoid or globose; cells nearly equal.

1. L. vulgaris Hill. Butter and Eggs, Jacob's Ladder, Wild Flax. A perennial, erect, smooth herb, with a bloom; stem 1–2 ft. high. Leaves linear or lanceolate, 1–3 in. long, often whorled. Racemes densely flowered. Sepals shorter than the spur. Corolla yellow, ¾–1 in. long; spur parallel to and as long as the tube; throat closed by a palate-like fold. Common in dry fields and pastures and along roadsides. Naturalized from Europe.

2. L. canadensis Dumont. Toadflax. Biennial; flowering stems erect, slender, rarely branched, smooth, 1–2 ft. high; sterile stems prostrate, with opposite or whorled leaves, 2–6 in. long. Leaves linear, entire, sessile. Racemes erect, slender; pedicels erect, as long as the calyx. Corolla small, blue and white, the spur thread-like, curved, longer than the pedicels. Capsule 2-valved, the valves 3-toothed. On dry or cultivated ground E.

III. ANTIRRHINUM L.

Annual or perennial herbs. Leaves entire, rarely lobed, the lower ones opposite, the upper alternate. Flowers axillary and solitary, or racemed and bracted. Calyx 5-parted. Corolla 2-lipped; the tube with a sac, the broad-bearded palate closing the throat. Stamens 4. Stigma with 2 short lobes. Capsule 2-celled, the upper cell opening by 1 pore, the lower by 2.

1. A. majus L. Snapdragon. Perennial; stem erect, smooth below, glandular-downy above, 1–2 ft. high. Leaves linear to oblong-lanceolate, entire, smooth, sometimes fleshy, sessile or short-petioled. Flowers in a terminal raceme; pedicels short, stout, erect in fruit. Corolla 1½–2 in. long, of many colors. Capsule oblique, the persistent base of the style bent forward. Common in gardens; cultivated from Europe, and often escaped.*

IV. PENTSTEMON Mitchell

Perennials, the stems branching from the base, unbranched above. Leaves opposite. Flowers usually showy, in a terminal panicle. Calyx of 5 nearly distinct sepals. Corolla tubular, the tube wide above and narrowed below; 2-lipped. Stamens 4 (2 long and 2 short), with a fifth antherless filament as long as the others, its upper half bearded. Capsule ovoid, acute.

1. P. hirsutus Willd. Stem somewhat sticky-downy, 1–2 ft. high. Leaves varying from oblong to lanceolate, 2–4 in. long, usually with small teeth. Flower cluster narrow. Corolla dingy violet, purplish, or whitish; the tube not much widened above, its throat nearly closed by a hairy palate. Sterile filament much bearded. Dry hillsides or stony ground.

2. P. gracilis Nutt. Slender Beardtongue. Stem 6–18 in. high, smooth below but the flower cluster covered with glandular, sticky hairs. Basal leaves spatulate or oblong; stem leaves most of them linear-lanceolate. Corolla purple or whitish, $\frac{3}{4}$–1 in. long, the tube enlarged above and its throat entirely open. Sterile filament bearded above along half its length. On moist prairies W.

3. P. lævigatus Ait. Stem usually smooth except the flower cluster, 2–4 ft. high. Leaves shining, those of the stem ovate-lanceolate or broadly lanceolate, 2–5 in. long, with a somewhat heart-shaped, clasping base. Flower cluster broader than in No. 1. Corolla white or oftener purplish, suddenly widened above, the throat not closed. Sterile filament slightly bearded toward the top. In rich soil.

4. P. Digitalis Nutt. Much resembling No. 3, but taller, sometimes 5 ft. high. Corolla white, the tube abruptly widened. In fields and thickets; sometimes cultivated.

5. P. barbatus Roth. Stems slender and rod-like, 3–4 ft. high. Leaves lanceolate, entire. Flower cluster long and loosely flowered. Flowers showy, drooping. Corolla tube slender, scarlet, somewhat bearded in the throat. Sterile filament beardless. Cultivated from Mexico.

V. GRATIOLA L.

Low herbs, growing in wet or damp ground. Leaves opposite, sessile. Flowers axillary and solitary, peduncled. Calyx 5-parted, usually with 2 bractlets at the base. Corolla somewhat 2-lipped. Perfect stamens 2. Stigma enlarged or 2-lipped. **Pod 4-valved, many-seeded.**

1. G. virginiana L. Stem cylindrical, 4–10 in. long, branching from the base. Leaves ¾–1½ in. long, varying from lance-oblong to spatulate. Corolla pale yellow, tinged with red. Common in muddy soil, along brooksides, etc.

VI. VERONICA L.

Herbs or shrubs. Lower leaves or all the leaves opposite, rarely whorled. Flowers in axillary or terminal racemes, rarely solitary. Calyx usually 4-parted. Corolla wheel-shaped or somewhat bell-shaped; limb usually 4-cleft, spreading, the side lobes commonly narrower. Stamens 2, inserted on the corolla tube at the sides of the upper lobe, projecting. Stigma somewhat knobbed. Capsule generally flattened, often notched at the apex, 2-celled, few–many-seeded.

1. V. americana Schwein. Brooklime. A perennial, smooth herb, somewhat prostrate below but the upper parts of the stem erect, 8–15 in. high. Leaves 1–2 in. long, lance-ovate or oblong, serrate, short-petioled. Racemes 2–4 in. long, axillary and opposite. Corolla wheel-shaped, blue. Capsule swollen, roundish. Muddy soil about springs and brooks.

2. V. officinalis L. Common Speedwell, Gypsy Weed. Perennial. Roughish-downy, with the prostrate stems spreading and rooting. Leaves wedge-oblong or nearly so, obtuse, serrate, somewhat petioled. Racemes dense, of many pale bluish flowers. Capsule rather large, inversely heart-shaped and somewhat triangular. Dry hillsides, open woods and fields.

3. V. serpyllifolia L. Thyme-Leaved Speedwell. Perennial; smooth or nearly so; branching and creeping below, but with nearly simple ascending shoots, 2–4 in. high. Leaves slightly crenate, the lowest ones petioled and roundish, those farther up ovate or oblong, the uppermost ones mere bracts. Raceme loosely flowered. Corolla nearly white or pale blue, beautifully striped with darker lines. Capsule inversely heart-shaped, its width greater than its length. Damp, grassy ground; a common weed in lawns.

4. V. peregrina L. Purslane Speedwell. A homely, rather fleshy, somewhat erect-branched annual weed, 4–9 in. high. Lowest leaves petioled, oblong, somewhat toothed; those above them sessile, the uppermost ones broadly linear and entire. Flowers solitary, inconspicuous, whitish, barely pediceled, appearing to spring from the axils of the small floral leaves. Corolla shorter than the calyx. Capsule roundish, barely notched, many-seeded. Common in damp ground, in fields and gardens.

VII. CASTILLEJA Mutis.

Herbs parasitic on the roots of other plants. Leaves alternate; the floral ones usually colored at the tip and more showy than the flowers. Flowers yellow or purplish in terminal leafy spikes. Calyx tubular, flattened, 2–4-cleft. Corolla tube included within the calyx; upper lip of the corolla very long, linear, arched, and inclosing the stamens, 2 of which are long and 2 short. Ovary many-ovuled.

1. C. coccinea Sprengel. Scarlet Painted Cup, Paint Brush, Indian Pink, Prairie Fire, Wickakee. A hairy, simple-stemmed herb, annual or biennial. Root leaves clustered, obovate or oblong; stem leaves cut; floral leaves 3–5-cleft and bright scarlet (occasionally yellow) toward the tips, as though dipped in a scarlet dye. Calyx nearly as long as the pale yellow corolla, 2-cleft. The spikes are often very broad, making this one of the most conspicuous of our native flowers. Damp, sandy ground, or on bluffs near streams; sometimes in marshes.

2. C. sessiliflora Pursh. Downy Painted Cup. Perennial; stem leafy, 6–15 in. high, covered with ash-colored down. Lowest leaves linear and entire, upper ones usually deeply cleft into narrow segments; floral leaves green, like the upper stem leaves. Calyx lobes more deeply cleft on the lower than on the upper side, linear-lanceolate. Corolla yellowish, nearly 2 in. long; upper lip about twice the length of the lower one. On prairies W. and S.W.

VIII. PEDICULARIS L.

Perennial herbs, with the lower leaves pinnately cut and the floral ones reduced to bracts. Flowers spiked. Corolla markedly 2-lipped; the upper lip much flattened laterally and arched, the lower lip spreading, 3-lobed. Stamens 4, beneath the upper lip. Capsule 2-celled, tipped with an abrupt point, several-seeded.

1. P. canadensis L. Common Lousewort. Hairy, with clustered simple stems, 1 ft. high or less. Leaves petioled, the lowermost ones pinnately parted, the others somewhat pinnately cut. Spike short, closely flowered, and leafy-bracted. Calyx split down the front. Corolla greenish-yellow and purplish, with its upper lip hood-like, curved under, and with 2 awl-like teeth near the end. Capsule flat, broadly sword-shaped. Knolls and openings among thickets.

91. BIGNONIACEÆ. Bignonia Family

Trees or shrubs, often twining or climbing, rarely herbs. Leaves usually opposite, without stipules. Flowers showy, zygomorphic. Corolla tubular, with a widened throat and a 5-lobed limb. Stamens usually 2 long and 2 short, or only 2. Ovary free from the calyx, 2-celled or rarely 1-celled, with many ovules. Fruit a capsule; seeds large, winged.

I. TECOMA Juss.

Woody vines, climbing by aërial rootlets. Leaves compound, odd-pinnate. Flowers large, in terminal clusters. Calyx bell-shaped, unequally 5-toothed. Corolla funnelform, enlarged above the calyx, 5-lobed, slightly 2-lipped. Stamens 4, 2 long and 2 short. Capsule slender, spindle-shaped, slightly compressed contrary to the partition, 2-valved, dehiscent. Seeds winged.*

1. T. radicans Juss. Trumpet Flower, Trumpet Creeper. Stems climbing high by numerous rootlets; bark shreddy. Leaves deciduous, petioled; leaflets 9–11, ovate to ovate-lanceolate, serrate, short-stalked, smooth or slightly downy. Flowers in short, terminal racemes or corymbs. Calyx tubular, ¾ in. long. Corolla 2–3 in. long, scarlet without, yellow within, the lobes spreading. Capsule 5–6 in. long, curved, often persistent through the winter. Seeds broadly winged. On borders of fields and in woods S.; often cultivated.*

II. CATALPA Scop.

Small trees. Leaves large, opposite, simple, petioled, deciduous. Flowers large and showy, in terminal panicles. Calyx irregularly 2-lipped. Corolla tubular-bell-shaped, oblique, 5-lobed, 2-lipped. Fertile stamens 2, sterile stamens 3, short. Fruit a linear, 2-valved, many-seeded capsule. Seeds winged.*

1. C. bignonioides Walt. Catalpa. A small tree with thin, rough gray bark, and light, soft but exceedingly durable wood. Leaves long-petioled, heart-shaped, entire or palmately 3-lobed, taper-pointed at the apex, palmately veined, downy. Branches of the panicle in threes; flowers large, 1–1½ in. long, white, variegated with yellow and purple. Corolla lobes undulate or crisped. Capsule

very slender, 1 ft. or more in length, pendulous. Seeds with long fringed wings. On margins of rivers and swamps S.; often cultivated.*

2. **C. speciosa** Warder. CATALPA. A tall tree with very durable wood. Leaves large, heart-shaped, taper-pointed. Corolla about 2 in. long, almost white, but slightly spotted; tube inversely conical; limb somewhat oblique, its lower lobe notched. Pod rather stout. Rich, damp woods, especially S. W.; often cultivated.

III. BIGNONIA L.

Woody vines. Leaves opposite, compound, usually tendril-bearing. Flowers large, in axillary clusters. Calyx cup-shaped, truncate, or undulate-toothed. Corolla spreading-tubular, somewhat 2-lipped, the lobes rounded. Stamens 4, 2 long and 2 short. Capsule linear, flattened parallel with the partition, the two valves separating from the partition at maturity; seeds flat, broadly winged.*

1. **B. capreolata** L. CROSS VINE. Stem climbing high, a transverse section of the older stems showing a conspicuous cross formed by the 4 medullary rays; branches smooth. Leaves evergreen, petioled; leaflets 2, ovate, taper-pointed with a blunt apex, heart-shaped at the base, entire, stalked; upper leaflets transformed into branching tendrils. Flowers numerous, short-peduncled. Corolla 2 in. long, reddish-brown without, yellow within. Capsule 6 in. long, flat, the valves with a prominent central nerve; seeds broadly winged on the sides, short-winged on the ends. Common in woods S.*

92. OROBANCHACEÆ. BROOM RAPE FAMILY

Leafless brownish root parasites; rootstock often tuberous, naked or scaly; stem usually stout, solitary, scaly. Flowers spiked or racemed. Sepals 4–5, free from the ovary. Corolla hypogynous, not actinomorphic, the tube curved, the limb 2-lipped. Stamens 4 (2 long and 2 short), inserted on the corolla tube; anthers 2-celled, the cells spurred at the base. Ovary 1-celled, of 2 carpels; style simple; stigma 2-lobed; ovules many. Capsule 1-celled, 2-valved, few–many-seeded; seeds very small.

I. CONOPHOLIS Wallr.

Stems often clustered, stout, covered with scales which overlap, the uppermost ones each with an axillary flower,

thus forming a spike. Calyx irregularly 4–5-cleft, split down the lower side. Corolla swollen below, decidedly 2-lipped, the upper lip arched. Stamens projecting.

1. C. americana Wallr. Squawroot, Cancer Root. Stems 3–6 in. high, yellowish or yellowish-brown. Flowers numerous, inconspicuous. Corolla dirty white or pale brown. In oak woods; not very common.

II. OROBANCHE L. (THALESIA)

Brownish or whitish plants, with naked scapes borne on scaly, mostly underground, stems. Calyx regular, 5-cleft. Corolla 5-lobed, slightly irregular. Stamens not projecting from the corolla tube.

1. O. uniflora L. One-Flowered Cancer Root. Slightly covered with clammy down. Stems very short-branched, each with 1–3 1-flowered scapes 3–5 in. high. Calyx lobes lance-awl-shaped, half as long as the corolla. Corolla yellowish-white, veiny, purple-tinged; palate with 2 yellow bearded ridges. Damp woods.

2. O. fasciculata Nutt. Stem scaly, upright, 3–4 in. high above ground and generally longer than the numerous 1-flowered peduncles. Calyx lobes short, triangular. Parasitic on wild species of *Artemisia*, etc., in sandy and loamy soil N.W. and W.

93. ACANTHACEÆ. Acanthus Family

Herbs or shrubs. Leaves opposite or whorled, without stipules. Flowers zygomorphic, usually with large bracts. Calyx of 4 or 5 unequal segments which considerably overlap each other. Corolla 4–5-parted and usually more or less 2-lipped. Stamens usually 2 long and 2 short, sometimes only 2. Ovary free from the calyx. Fruit usually a capsule. Seeds not winged. A large family, mostly tropical, with only a few insignificant wild species in the northern United States.

I. DIANTHERA L.

Perennial herbs; stem smooth. Leaves opposite, entire or toothed. Flowers axillary, solitary or clustered, zygomorphic. Calyx 5-parted. Corolla 2-lipped; upper lip erect, concave, entire or notched; the lower prominently veined, spreading,

3-lobed. Stamens 2, inserted in the throat of the corolla. Ovary 2-celled, 4-ovuled; style simple, acute. Capsule flattened, narrowed below into a little stalk.*

1. **D. americana** L. WATER WILLOW. Stem erect, slender, 2–3 ft. high. Leaves lanceolate to linear-lanceolate, taper-pointed at the apex, narrowed below to the sessile or short-petioled base. Flowers bracted, in short spikes, on peduncles as long as the leaves. Corolla pale blue or purple, the tube as long as the lips, lower lip wrinkled. Capsule about the length of the calyx. In water, S.*

II. RUELLIA L.

Perennial herbs; stems swollen at the joints and often between them, somewhat 4-angled. Leaves sessile or short-petioled, mostly entire. Flowers axillary, solitary or clustered, showy, white, blue, or purple. Calyx 2-bracted, 5-parted, the divisions linear and awl-shaped. Corolla tube slender, often much elongated, the limb spreading, nearly equally 5-lobed. Stamens 4 (2 long and 2 short), included or slightly projecting. Style slender. Capsule slender, narrowed below, 4–12-seeded.*

1. **R. ciliosa** Pursh. HAIRY RUELLIA. Stem erect, rather stout, often few-branched above, covered with white hairs, 4–30 in. high. Leaves oblong to ovate, acute or obtuse at the apex, narrowed and mostly sessile at the base, hairy-fringed. Flowers pale blue, solitary or 2–3 together. Calyx lobes bristle-shaped, half the length of the corolla tube. Tube of the corolla 2 in. long. Capsule shorter than the calyx, smooth, 8–12-seeded. A very variable species, the flowers often without a corolla. In dry woods and fields S.*

2. **R. strepens** L. SMOOTH RUELLIA. Stem erect, slender, usually simple, smooth or hairy, 1–3 ft. high. Leaves ovate to oblong, acute at the apex, narrowed below into a short petiole. Flowers solitary or in small clusters, sessile or short-peduncled. Calyx lobes shorter than the tube of the corolla, downy or fringed. Corolla blue, the tube $1\frac{1}{2}$–2 in. long, the limb 1–$1\frac{1}{2}$ in. wide. Capsule usually longer than the calyx, smooth, 8–12-seeded. The later flowers often without a corolla. On rich, dry soil.*

94. PLANTAGINACEÆ. PLANTAIN FAMILY

Annual or perennial scape-bearing herbs. Leaves usually all basal, with parallel ribs. Flowers small, green, usually

spiked, regular and bisexual (Fig. 28). Sepals 4, persistent. Corolla hypogynous, salver-shaped, thin and dry; lobes 4, spreading. Stamens 4, usually inserted on the corolla tube; filaments thread-like; anthers large and versatile. Ovary free, usually 2–4-celled; style thread-like. Fruit a 1–4-celled, 1 or more seeded membranous capsule, which splits open transversely, the top coming off like a lid.

FIG. 28. Flowers of plantain (*Plantago lanceolata*), six times natural size

A, earlier stage, pistil mature, stamens not yet appearing outside the corolla; *B*, later stage, pistil withered, stamens mature

PLANTAGO L.

Characteristics of the genus as given above for the family.

1. P. major L. PLANTAIN. Perennial, from a very short rootstock. Leaves ovate to oval, strongly 5–9-ribbed, acute or obtuse at the apex, rounded at the base into a long, concave petiole, entire or toothed, smooth or slightly downy. Scape taller than the leaves, downy, spike densely flowered; bracts short, ovate. Flowers perfect. Stamens 4, projecting. Capsule ovoid, about twice the length of the calyx, 5–16-seeded; seeds angled and with a netted outer coat. Common in dooryards.*

2. P. Rugelii Decaisne. Leaves as in *P. major*, but smaller and thinner. Spikes less dense, usually drawn out to a slender point. Capsule 4–10-seeded; seeds oval, the outer coat not netted. In fields, woods, and waste ground.

3. P. lanceolata L. RIB GRASS. Biennial or perennial; soft-hairy or nearly smooth. Leaves numerous, lanceolate to elliptical, acute, long-petioled, strongly 3–5-ribbed, entire or toothed. Scapes much longer than the leaves, striate-angled, 1–2 ft. high; spike short and dense. Bracts and sepals ovate. Corolla smooth. Capsule longer than the calyx, 2-seeded. Naturalized from Europe; common in meadows.*

4. P. Purshii R. & S. Annual. White-woolly or silky. Scapes slender; leaves linear, usually 3-nerved; spikes dense, cylindrical, and very woolly; bracts stiff, as long as the flowers or slightly longer. Capsule 2–4-seeded, somewhat longer than the calyx. On dry prairies and plains W. and S.W.

5. P. aristata Michx. Large-Bracted Plantain. Annual. Leaves broadly linear, entire or sparingly and finely toothed, narrowed below into a margined petiole, smooth or silky-downy. Scape longer than the leaves, 6–10 in. high; spike dense. Bracts linear, ½–1 in. long. Stamens 4. Capsule 2-seeded, longer than the calyx. Common on dry soil.*

6. P. heterophylla Nutt. Many-Seeded Plantain. Annual. Leaves linear, fleshy, entire or with a few spreading teeth, smooth or slightly downy. Scapes slender, 3–6 in. high; spike very slender, many-flowered, the lower flowers often scattered. Bracts ovate, longer than the sepals. Stamens 2. Capsule twice the length of the calyx, many-seeded. Common in cultivated ground, especially S.*

95. RUBIACEÆ. Madder Family

Herbs, shrubs, or trees. Leaves opposite and entire, with stipules between them, or appearing whorled since the stipules resemble the leaves. Flowers epigynous, always bisexual, frequently dimorphous (as in *Houstonia*, *Mitchella*, and *Bouvardia*). Limb of the calyx 3–6-toothed. Corolla regular, inserted on the calyx-tube, as many-lobed as the calyx. Stamens equal in number to the divisions of the corolla. Ovary 2 or more celled. A very large and important family, of which many of the noteworthy species, for instance the coffee shrub and the cinchona tree, are natives of warm or tropical climates.

I. GALIUM L.

Annual or perennial herbs; stems slender, 4-angled. Leaves appearing whorled. Flowers small, in axillary or terminal cymes or panicles, bisexual or rarely dicœcious. Calyx tube short, the teeth minute or wanting. Corolla wheel-shaped, 3–4-lobed. Stamens 3–4, short. Ovary 2-celled; styles 2, short, united below. Fruit 2 united, sometimes fleshy, 1-seeded carpels, which do not split open.*

1. G. Aparine L. Goose Grass. Annual; stem weak, decumbent, sharply 4-angled and with backward-pointing prickly hairs, widely branched, 2–4 ft. long. Leaves 6–8 in a whorl, oblanceolate, prickly-hairy on the margins and midrib. Peduncles axillary, longer than the leaves, 1–3-flowered; flowers white. Fruiting pedicels erect; fruit dry, covered with hooked bristles. In waste places.*

2. G. circæzans Michx. Wild Licorice. Perennial; stems several, erect, smooth or downy, 12–18 in. high. Leaves 4 in a whorl, oval to ovate, obtuse at the apex, strongly 3-nerved, downy. Cymes long-peduncled, repeatedly branched. Flowers nearly sessile, greenish-purple; pedicels at length recurved. Fruit with hooked bristles. In dry, open woods S. Easily recognized by the sweet, licorice-like taste of the leaves.*

3. G. boreale L. Northern Bedstraw. Perennial; stem smooth, erect, 1–2 ft. high. Leaves in fours, linear-lanceolate, 3-nerved. Flowers bright white, in compact cymes, grouped in a dense panicle. Fruit usually with minute bristles. In rocky soil along banks of streams, especially N.

4. G. concinnum T. & G. Shining Bedstraw. Stems slender, smooth, shining, commonly much branched, 6–12 in. high, often with the angles minutely roughened. Leaves usually in sixes, linear or nearly so, often slightly cuspidate. Flowers small, white, in open cymes. Fruit small, smooth. Dry hills and woodlands.

5. G. asprellum Michx. Rough Bedstraw. Perennial; stem branching, weak, 3–5 ft. long, often reclining on bushes, with many hooked prickles directed backwards. Leaves usually in sixes, or on the branches in fours or fives, narrowly oval to lanceolate or oblanceolate, cuspidate, with midribs and margins almost prickly. Flowers white, in several–many-flowered cymes. Fruit smooth. In rich, moist soil.

6. G. triflorum Michx. Perennial; stems reclining or prostrate, angles rough-bristly. Leaves mostly in sixes, lance-oblong, mucronate. Flowers usually in threes, on slender peduncles. Woodlands, especially N.

7. G. hispidulum Michx. Bedstraw. Perennial, from yellow roots; stems diffusely branched, smooth or slightly roughened, downy at the joints, erect or decumbent, 1–2 ft. long. Leaves 4 in a whorl, narrowly oval, acute, rough on the margins and mid-vein. Peduncles 1–3-flowered; flowers white; pedicels becoming reflexed. Fruit a bluish-black, roughened berry. On dry, sandy soil.*

II. MITCHELLA L.

A pretty, trailing, evergreen herb. Leaves roundish-ovate, petioled. Flowers fragrant, white or pinkish, dimorphous,

growing in pairs, joined by their ovaries. Calyx 4-toothed. Corolla funnel-shaped, with the lobes bearded within. Stamens 4, short. Style 1; stigmas 4, slender. Fruit double, composed of the united ovaries; really a drupe, containing 8 seed-like, bony nutlets, ripening into tasteless scarlet berries, which cling to the plant through the winter.

1. **M. repens** L. Partridge Berry, Squaw Vine, Two-Eye Berry. Common in dry woods, especially under evergreen coniferous trees.

III. BOUVARDIA Salisb.

Smooth perennials. Leaves lanceolate, thickish. Calyx 4-lobed, the divisions slender. Corolla with a long and narrow or rather trumpet-shaped tube, and spreading, 4-lobed limb. Anthers 4, inserted in the throat of the corolla, almost sessile. Stigmas 2, flat. Capsule globular, 2-celled, many-seeded. Flowers dimorphous.

1. **B. triphylla** Salisb. Three-Leaved Bouvardia. Somewhat shrubby. Leaves nearly smooth, ovate or oblong-ovate; the lower ones in threes, the upper ones sometimes in pairs. Corolla scarlet and slightly downy outside.

2. **B. leiantha** Benth. Downy-Leaved Bouvardia. Leaves rather downy. Corolla deep scarlet, smooth outside.

Both species cultivated from Mexico; in greenhouses.

IV. HOUSTONIA L.

Annual, biennial, or perennial herbs; stems erect or diffuse. Leaves entire; stipules often only a line connecting the bases of opposite leaves. Flowers small, solitary or clustered, dimorphous, the stamens projecting and the style short in one form, while in the other the stamens are short and the style projecting. Calyx 4-toothed, persistent. Corolla wheel-shaped to funnelform, 4-lobed. Stamens 4. Ovary 2-celled; style slender; stigmas 2. Fruit a 2-celled, few–many-seeded capsule, opening at the apex, free from the calyx.*

1. **H. cœrulea** L. Bluets, Innocence, Quaker Ladies, Eyebright. Perennial, from very slender rootstocks; stems tufted, erect, smooth, forking, 3–6 in. high. Leaves sessile, often hairy-fringed, the lower spatulate, the upper lanceolate. Flowers solitary,

on slender axillary peduncles. Calyx small. Corolla salverform, blue or white, yellow in the throat, smooth. Capsule laterally compressed, 2-lobed, shorter than the calyx. Common on open ground.*

2. H. patens Ell. Small Bluets. Annual; stem erect, branched at the base, forking above, smooth, 2–4 in. high. Lower leaves oval to ovate, petioled, the upper narrower and sessile. Flowers solitary, on slender, axillary peduncles, blue or white. Calyx small. Lobes of the corolla about as long as the tube. Stamens and style projecting or included. Capsule compressed, as long as the calyx. Common on dry, open ground.*

3. H. purpurea L. Large Bluets. Perennial; stem stout, erect, simple or branched, smooth or downy, 4-angled, 6–12 in. high. Leaves ovate to ovate-lanceolate, sessile or short-petioled, 3–5-nerved, often hairy-fringed on the margins. Flowers in terminal cymes, purple to nearly white. Corolla funnelform, the tube longer than the limb, hairy within. Stamens and style projecting or included. Capsule compressed-globose, much shorter than the calyx. In dry, open woods.*

4. H. longifolia Gaertn. Long-Leaved Bluets. Perennial; stem erect, branched, smooth, 4-angled, 8–12 in. high. Leaves sessile, the lower oblanceolate or spatulate, the upper linear, 1-nerved. Corymbs terminal, few-flowered. Corolla light purple to white, the lobes much shorter than the tube. Capsule compressed-globose, nearly as long as the calyx. In dry, open woods.*

96. CAPRIFOLIACEÆ. Honeysuckle Family

Mostly shrubs. Leaves opposite, without true stipules. Flowers epigynous, often zygomorphic. Corolla tubular or wheel-shaped. Stamens usually as many as the corolla lobes and inserted on the corolla tube. Fruit a berry, drupe, or capsule.

I. DIERVILLA Mill.

Low, upright shrubs. Leaves taper-pointed, serrate. Flowers in loose terminal or axillary clusters or cymes. Calyx with a limb of 5 linear divisions. Corolla funnel-shaped, almost regularly 5-lobed. Stamens 5. Ovary slender, 2-celled, ripening into a 2-valved, many-seeded pod.

1. D. Lonicera Mill. Common Bush Honeysuckle. Bushy, 1–4 ft. high. Leaves ovate or oblong-ovate, petioled. Peduncles 1–3-flowered. Pods tapering to a slender point. Rocks, especially N.

2. D. japonica DC. WEIGELA. A stout, branching shrub, 3–6 ft. high. Leaves broadly oval, acute at the apex, rounded at the base, coarsely serrate, rough above, downy beneath, short-petioled. Flowers spreading, funnelform, rose color, 1–1½ in. long. Calyx lobes deciduous. Corolla downy without, the lobes spreading. Capsule oblong or spindle-shaped. Seeds with netted wings. Introduced from Japan; common in cultivation.*

II. LONICERA L.

Shrubs or woody vines. Leaves simple, usually entire, those of a pair often appearing as if joined together at the base, so that the stem seems to rise through them. Calyx tube ovoid, 5-toothed. Corolla tubular to bell-shaped, often knobbed at the base or 2-lipped. Stamens 5. Ovary 2–3-celled, ovules several in each cell; style slender; stigma knobbed. Fruit a 1–3-celled, 1–few-seeded berry.*

A

More or less upright bushes, not climbing.

1. L. tatarica L. TARTARIAN HONEYSUCKLE. A branching shrub, 5–8 ft. high. Leaves oval or ovate, heart-shaped, shining. Flowers many, showy, rose-colored. Fruit consisting of 2 red berries; somewhat united below at maturity. Cultivated from Asia.

2. L. canadensis Marsh. EARLY FLY HONEYSUCKLE. A straggling bush, 3–5 ft. high. Leaves ovate or oval, slightly heart-shaped, thin, at first downy beneath. Flowers straw-yellow, on short, slender peduncles. Corolla lobes nearly equal; tube pouched at the base. Fruit 2 separate red berries.

B

Stems twining.

3. L. japonica Thunb. JAPAN HONEYSUCKLE. Stem twining high; young branches downy. Leaves ovate to oblong, entire, smooth above, pale and downy beneath, all short-petioled. Peduncles axillary, 2-bracted, 2-flowered. Flowers white or pink, fading to yellow, 2-lipped, the lips nearly as long as the downy tube. Stamens and style projecting. Fruit black. Common in cultivation; introduced from Japan.*

4. L. sempervirens L. CORAL HONEYSUCKLE, TRUMPET HONEYSUCKLE. Stem twining high. Leaves evergreen (in the South), oval to oblong, obtuse, entire, smooth above, pale and often downy

beneath; the lower petioled, the upper pair nearly semi-orbicular and joined at the base. Flowering spikes terminal, bearing several whorls. Corolla about 2 in. long, slender, smooth; the limb short, nearly equally 5-lobed, scarlet without, bright yellow within. Stamens slightly projecting; fruit red. On low ground; often cultivated.*

5. L. Caprifolium L. European Honeysuckle. A moderately high-climbing shrub. Leaves smooth and deciduous, several of the upper pairs united at their bases to form a flattish disk or somewhat cup-shaped leaf. Flowers in a single terminal whorl, very sweet-scented. Corolla whitish, red, or yellow, 2-lipped, with the lips recurved. Cultivated from Europe.

6. L. Sullivantii Gray. Yellow Honeysuckle. Stem somewhat twining. Leaves oval to obovate, obtuse, entire, green above, with a bloom beneath, the lower short-petioled, the upper sessile or joined at the base. Flowers in crowded, terminal whorls, bright yellow, fragrant. Corolla tube slender, 1–1½ in. long, bilabiate, 4-lobed, pubescent within. Stamens and style projecting. On river banks and hillsides; often cultivated.*

III. SYMPHORICARPOS Ludwig

Shrubs. Leaves short-petioled, deciduous. Flowers in axillary clusters. Calyx tube globose, 4–5-toothed. Corolla bell-shaped, 4–5-lobed, sometimes knobbed at the base, smooth or hairy within. Stamens 4–5. Ovary 4-celled; 2 of the cells with a single fertile ovule in each, the other cells with several abortive ovules; style slender; stigma knobbed or 2-lobed. Fruit a 4-celled, 2-seeded berry.*

1. S. racemosus Michx., var. **lævigatus.** Snowberry. An ornamental shrub, 2–3 ft. high. Flowers in loose terminal racemes, which are often leafy. Corolla bell-shaped, much bearded inside, pinkish-white. Stamens and style not projecting. Berries rather large, snow-white, remaining long on the branches. Rocky banks, often cultivated.

IV. LINNÆA L.

A very small, slender, creeping evergreen shrub; branches inclined, ending in a slender, erect, 2-flowered peduncle. Leaves opposite, without stipules. Flowers nodding, on slender pedicels, with 2 bractlets. Calyx tube ovoid; limb 5-lobed. Corolla nearly bell-shaped, 5-lobed. Stamens 4, inserted near the base of the corolla; 2 of them longer than the other 2.

Ovary 3-celled; style thread-like; stigma knobbed; ovules many in 1 cell, solitary in the 2 others. Fruit nearly globose, 1-seeded.

1. **L. borealis** L. TWIN FLOWER. A beautiful, delicate plant. Corolla pale pink, very fragrant. Moist woods, in moss and cold bogs N.

V. TRIOSTEUM L.

Coarse, hairy, perennial herbs. Leaves large, those of each pair somewhat joined at the base, so that the stem appears to rise through them. Calyx tube ovoid; divisions of the limb leaf-like, lance-linear, persistent. Corolla knobbed at the base, nearly equally 5-lobed. Ovary usually 3-celled, ripening into a drupe with 3 nutlets.

1. **T. perfoliatum** L. TINKER WEED, WILD COFFEE, FEVERWORT, HORSE GENTIAN. Stem unbranched, soft-hairy, 2–4 ft. high. Leaves spatulate-ovate, abruptly narrowed at the base, 4–7 in. long and 2–4 in. wide, bordered with a fringe of hairs. Flowers dark brownish-purple. Corolla about $\frac{1}{2}$ in. long, sticky-downy. Fruit ellipsoidal, orange-colored when ripe. Common along fence rows and in rocky woods.

VI. VIBURNUM L.

Shrubs or small trees. Leaves simple, entire, dentate or lobed, with or without stipules. Flowers small, white, in terminal cymes; the outer flowers of the cyme sometimes greatly enlarged and sterile. Calyx tube very small, 5-toothed. Corolla wheel-shaped or bell-shaped, 5-lobed. Stamens 5, inserted in the tube of the corolla. Ovary 1–3-celled, 1–3-ovuled, but only 1 ovule maturing; style short, 3-lobed. Fruit a 1-seeded drupe, with soft pulp.*

A

Flowers around the margin of the cyme without stamens or pistils, large and showy.

1. **V. alnifolium** Marsh. HOBBLEBUSH, WITCH HOBBLE. A shrub about 5 ft. high, with the branches reclining and often rooting and forming loops (whence the popular names). Leaves very large, roundish, abruptly taper-pointed, serrate, with a rusty down on the petioles and veinlets. Cymes very broad and showy. Fruit red, not eatable.

2. V. Opulus L., var. **americanum.** Cranberry Tree, High-Bush Cranberry. A handsome, upright shrub. Leaves 3–5-ribbed and 3-lobed. Fruit bright red, juicy, very acid, and used as a substitute for cranberries. Common N. The form known as "snowball," with all the flowers showy and sterile, is cultivated from Europe.

B

Flowers all small and bisexual.

3. V. acerifolium L. Maple-Leaved Arrowwood. A slender shrub, 3–6 ft. high. Leaves broadly ovate to heart-shaped, palmately veined and 3-lobed, serrate or nearly entire, petioled, downy, becoming smooth above. Cymes peduncled, about 7-rayed, 2–3 in. wide; sterile flowers none. Fruit oval, black; stone flat, 2-ridged on the edges. In dry, open woods.*

4. V. dentatum L. Arrowwood. A shrub 8–15 ft. high. Leaves broadly ovate to oval, acute at the apex, rounded or heart-shaped at the base, coarsely dentate, smooth above, hairy in the axils of the veins beneath, short-petioled. Cymes long-peduncled, 7-rayed, 2–3 in. wide; sterile flowers none. Calyx smooth. Fruit globose, dark blue; stone compressed, grooved on one side. In rich, damp soil.*

5. V. nudum L. Withe-Rod. A shrub 8–12 ft. high. Leaves ovate to lanceolate, entire or slightly toothed, acute at both ends, thick, smooth above, the veins prominent beneath; petiole short. Cymes short-peduncled, 5-rayed; sterile flowers none. Fruit ovoid, blue. Common in swamps.*

6. V. Lentago L. Nannyberry, Sheepberry. A shrub or small tree, sometimes 30 ft. high. Leaves ovate, sharply serrate, taper-pointed, usually smooth on both sides. Flower clusters large compound cymes. Fruit oval, ½ in. or more long, bluish-black, with a bloom, eatable. In woods and on banks of streams.

7. V. prunifolium L. Black Haw. A small tree, 15–20 ft. high. Leaves oval to ovate, acute or obtuse at each end, finely and sharply serrate, smooth and shining above, often slightly downy beneath; petioles dilated and rusty-downy. Cymes sessile, large, 4–5-rayed; sterile flowers none. Fruit oval, bluish-black, eatable. In rich, moist woods.*

VII. SAMBUCUS L.

Shrubs with odd-pinnate leaves. Calyx limb minute or wanting. Flowers very many, small, white, in compound cymes. Corolla with a small, somewhat urn-shaped tube, and a flattish, spreading, 5-cleft limb. Stamens 5. Stigmas 3, sessile. Fruit a globular, pulpy drupe, 3-seeded, appearing like a berry.

1. S. canadensis L. Common Elder. Stems 5–10 ft. high, with a thin cylinder of wood surrounding abundant white pith. Leaflets 5–11, oblong, taper-pointed, smooth. Cymes flat and often very large. Fruit purplish-black, insipid or almost nauseous, but somewhat used in cookery.

2. S. racemosa L. Red-Berried Elder. More woody, with brown pith. Leaflets fewer, downy beneath, especially when young. Cymes panicled and somewhat pyramidal. Fruit scarlet.

97. VALERIANACEÆ. Valerian Family

Herbs, rarely shrubs. Leaves opposite, without stipules. Flowers epigynous, small, usually not actinomorphic, in forking cymes. Corolla funnel-shaped, the base often with a sac or spur. Stamens 1–3 or 5, inserted at the base of the corolla tube; filaments slender, anthers versatile. Ovary cells 3; two of them not ovule-bearing, the third with a single ovule hanging from the top; style thread-like; stigma blunt or 2–3-lobed. Fruit small, not splitting open.

I. VALERIANA L.

Perennial, rarely annual, herbs. Basal leaves crowded; stem leaves opposite or whorled, entire or pinnately cut. Flowers in corymbed, headed, or panicled cymes. Limb of the calyx consisting of several plumy bristles. Lobes of the corolla 5 or rarely 3–4, unequal. Stamens 3. Stigma knobbed. Fruit flattened, ribbed, 1-celled, 1-seeded.

1. V. edulis Nutt. An upright, straight-stemmed plant, 1–4 ft. high. Leaves all thickish and closely fringed with short hairs; root leaves linear-spatulate or lanceolate-spatulate, entire; stem leaves pinnately parted, the 3–7 divisions long and narrow. Flowers almost dicœcious in a long, interrupted panicle. Corolla whitish. Root long and stout, eaten by Indians. Low ground and wet prairies, especially N.W.

2. V. officinalis L. Garden Valerian. Plant smooth or hairy below, strong smelling. Rootstock short. Leaves all pinnate; basal leaves long-petioled, soon withering; stem leaves 2–5 in. long, sessile, the leaflets lanceolate, entire or serrate. Corolla pale pink. Rootstocks strong-scented, used in medicine. Cultivated from Europe.

II. VALERIANELLA Hill

Annual herbs; stem forking regularly. Leaves opposite, entire or dentate. Flowers in crowded, terminal, bracted cymes. Calyx limb toothed or wanting. Corolla white or purplish, funnelform, 5-lobed. Stamens 3. Style 3-lobed. Fruit 3-celled, 1-seeded.*

1. V. Locusta Betcke. LAMB LETTUCE. Stem erect, smooth, or downy at the nodes, many times forked, 9–12 in. high. Basal leaves tufted, spatulate to obovate, entire; the upper lanceolate, dentate, sessile. Cymes short-peduncled, bracts linear. Flowers pale blue. Fruit compressed, oblique. On rich soil in waste places. Sometimes cultivated for salad. Introduced from Europe.*

2. V. radiata Dufr. CORN SALAD. Stem erect, smooth above, downy below, 2–4 times forked, 8–12 in. high. Lower leaves spatulate, entire; the upper lanceolate, clasping at the base, dentate. Cymes compact; bracts lanceolate. Flowers white. Fruit ovoid, downy, furrowed. On damp soil.*

98. CUCURBITACEÆ. GOURD FAMILY

Somewhat succulent, tendril-bearing, prostrate or climbing, herbaceous plants. Leaves alternate, with stipules. Flowers epigynous, diœcious or monœcious, often sympetalous. Calyx limb (if present) 5-lobed. Corolla usually 5-lobed and with its tube more or less united with the calyx tube. Stamens perigynous or borne upon the corolla; the anthers usually joined in long, serpentine ridges. Ovary 3-celled; stigmas 2 or 3. Fruit generally a pepo (like the melon, squash, and pumpkin), but sometimes dry. Seeds commonly large and flat. A large family, mostly of tropical plants, many with eatable fruit, but some species poisonous.

I. CUCURBITA L.

Annual or perennial herbs; stem trailing or climbing, 2–20 ft. long. Leaves angular-lobed; tendrils branching. Flowers monœcious, solitary or in small clusters. Calyx 5-toothed, the limb deciduous. Corolla bell-shaped, 5-lobed. Staminate flowers with 3 stamens and no pistil; pistillate flowers with 1 pistil and 3 imperfect stamens. Style short; stigmas 3–5, each 2-lobed. Fruit 1-celled, with numerous seeds on the 3 parietal placentæ.*

1. C. fœtidissima HBK. Missouri Gourd. Stem stout, rough and hairy. Root very large, carrot-shaped. Leaves thick, triangular heart-shaped. Flowers 3–4 in. long. Fruit globose or somewhat obovoid, 2–3 in. in diameter. Dry soil W. and S.W.

2. C. Melopepo L. Summer Squash. Stem rough-hairy, angled, 2–5 ft. long. Leaves broadly heart-shaped, angularly 3–5-lobed, rough. Flowers yellow, short-peduncled. Fruit roundish, longitudinally compressed, the margin smooth, wavy, or tubercular. Common in cultivation.*

3. C. verrucosa L. Crookneck Squash. Stem rough-hairy, angled and striate, 5–10 ft. long. Leaves cordate, deeply 5-lobed, very rough, long-petioled. Flowers light yellow, long-peduncled. Fruit clavate, the base often slender and curved, smooth or tuberculate, very variable. Common in cultivation.*

II. CUCUMIS L.

Annual herbs; stems trailing, usually shorter and more slender than in the preceding genus; tendrils not forked. Leaves varying from entire or nearly so to deeply cut. Sterile flowers in clusters, fertile ones solitary in the leaf axils. Corolla of 5 acute petals, which are but little joined at the base. Stamens not evidently united. Style short; stigmas 3, each 2-lobed. Fruit rather long. Seeds not large, lance-oblong, not margined.

1. C. sativus L. Cucumber. Leaves somewhat lobed, the middle lobe largest. Fruit more or less covered when young with rather brittle, blackish prickles, which fall off as it ripens. Cultivated from S. Asia. [Other varieties of the genus *Cucumis* are the muskmelon, cantaloupe, and nutmeg melon. Other commonly cultivated genera are *Citrullus*, the watermelon, and *Lagenaria*, the bottle gourd. Two wild genera, *Echinocystis*, the wild cucumber, and *Sicyos*, the star cucumber, which blossom through the summer and autumn, are common in the northern states and the Middle West.]

99. CAMPANULACEÆ. Campanula Family

Herbs, with milky juice. Leaves alternate, without stipules. Flowers epigynous, actinomorphic, not clustered. Calyx 5-lobed. Corolla regular, bell-shaped, 5-lobed. Stamens 5, usually free from the corolla and not united. Style 1, usually hairy above; stigmas 2 or more. Fruit a capsule, 2 or more celled, many-seeded.

I. SPECULARIA Fabricius

Annual; stems slender, angled. Leaves entire or toothed. Flowers axillary, regular, solitary or in small clusters, sessile, bracted. Calyx tube slender, 3–5-parted. Corolla wheel-shaped, 5-lobed. Stamens with the filaments flattened and shorter than the anthers. Ovary 3-celled, many-ovuled; stigmas 3. Fruit a prismatic, 3-celled, many-seeded capsule.*

1. S. perfoliata A. DC. SPECULARIA. Stem erect, simple or branched from the base, angles roughened, 10–20 in. high. Leaves ovate to lanceolate, acute at the apex, sessile, crenate or entire, the upper bract-like. Flowers solitary or in pairs. Corolla blue, often wanting. Capsule cylindrical, smaller above. In waste places.*

II. CAMPANULA L.

Annual, biennial, or perennial herbs. Flowers solitary, racemed or spiked, regular, blue or white. Calyx 5-lobed or parted. Corolla wheel-shaped to bell-shaped, 5-lobed. Stamens 5, free from the corolla, distinct; filaments dilated at the base. Ovary 3–5-celled, many-ovuled; style 3-parted. Capsule short, bearing the persistent calyx lobes at its apex, many-seeded, splitting open on the sides.*

1. C. americana L. TALL BELLFLOWER. Annual or biennial. Stem erect, usually unbranched, 3–6 ft. high. Leaves varying from ovate to lanceolate, serrate, $2\frac{1}{2}$–6 in. long. Spike 1–2 ft. long. Corolla wheel-shaped, light blue, about 1 in. in diameter. Moist, rich soil, especially in thickets.

2. C. rotundifolia L. HAREBELL. A slender, smooth, branching perennial, 5–12 in. high. Root leaves broadly ovate-heart-shaped, generally somewhat crenate, soon withering; stem leaves varying from linear to narrowly lanceolate, entire. Pedicels slender; flowers solitary or somewhat racemed, the buds erect but the fully opened flower drooping. Calyx teeth erect, awl-shaped. Corolla bell-shaped, $\frac{1}{3}$–1 in. long, its lobes short and recurved. Rocky hillsides, especially N.

3. C. aparinoides Pursh. MARSH BELLFLOWER. Stem angular, unbranched, slender, weak, and leaning on the grass among which it usually grows, the angles clothed with minute, backward-pointing prickles. Leaves lance-linear, nearly entire. Flowers terminal, about $\frac{1}{3}$ in. long, white. Corolla bell-shaped. Wet meadows, in tall grass.

100. COMPOSITÆ. Composite Family

Flowers epigynous, in a dense head, on a common receptacle, surrounded by an involucre composed of many bracts (Fig. 29), with usually 5 stamens inserted on the corolla, the anthers united into a tube which surrounds the style.

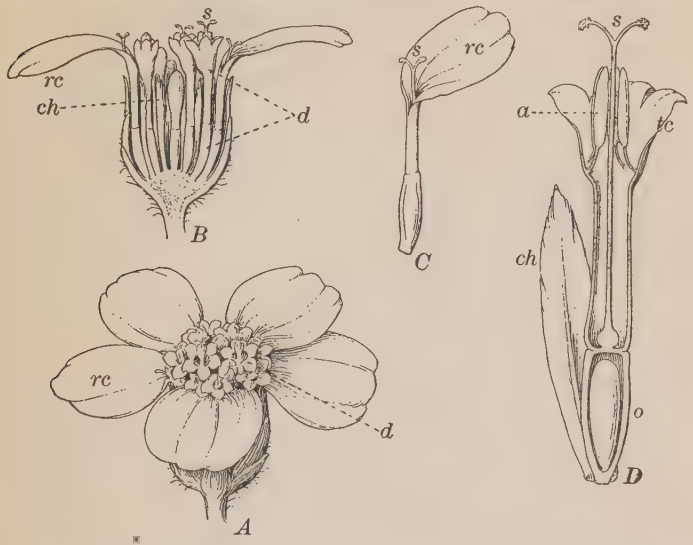


FIG. 29. Flower cluster and flowers of yarrow

A, flower cluster; *B*, section of flower cluster; *C*, a ray flower; *D*, a disk flower. *a*, anthers; *ch*, chaff of disk; *d*, disk flowers; *o*, ovary; *rc*, corollas of ray flowers; *s*, stigmas; *tc*, corolla of tubular flower. (*A*, *B*, *C*, 7 times natural size; *D*, 18 times natural size)

Calyx with its limb sometimes wanting; when present taking the form of scales, bristles, etc., known as *pappus* (Fig. 30). Corolla either strap-shaped (Fig. 29, *rc*) or tubular (Fig. 29, *tc*); in the former case often 5-toothed, in the latter usually 5-lobed. Style 2-cleft above. Fruit an akene, often provided with means of transportation. This is the largest family of flowering plants and among the most specialized for insect

pollination. The genera of the northern United States are divided into two suborders: I. TUBULIFLORÆ, corolla of the bisexual flowers tubular and 5-lobed; II. LIGULIFLORÆ, corollas all strap-shaped and flowers all bisexual.

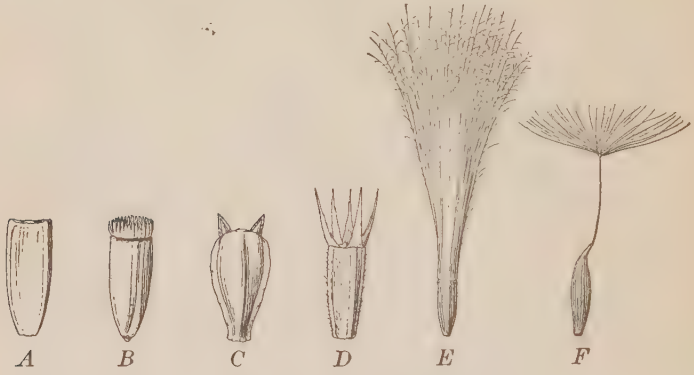


FIG. 30. Akenes with various types of pappus

A, *Rudbeckia*, pappus wanting; *B*, *Cichorium*, pappus a crown of fine scales; *C*, *Coreopsis*, pappus of 2 small scales; *D*, *Helenium*, pappus a crown of conspicuous scales; *E*, *Cirsium*, pappus a tuft of plumose hairs; *F*, *Lactuca*, pappus borne on a long beak

I. TUBULIFLORÆ [1]

Corollas some or all of them tubular.

Rays white, pink, or purplish.

Rays many; akenes flat; pappus wanting; low herbs. Bellis, I

Rays many; akenes cylindrical or winged, grooved; pappus wanting; tall herbs or shrubby. Chrysanthemum, X

Rays many; akenes flat; pappus of an outer row of minute scales and an inner row of delicate bristles. Erigeron, II

Rays many; akenes cylindrical or ribbed; pappus wanting; strong-scented, branching herbs. Anthemis, IX

Rays few. Achillea, VIII

[1] The characters in this key are not necessarily true of all species in the genera referred to, but only of those described below.

Rays yellow.
Disk purplish-brown. Rudbeckia, IV
Disk gray. Lepachys, V
Disk yellow.
Involucre of 2 rows of bracts, the outer rather leaf-like. Coreopsis, VI
Involucre of reflexed scales; pappus of 5–8 scales. Helenium, VII
Involucre of erect scales; pappus of abundant soft hairs. Senecio, XI
Rays none, but the marginal flowers sterile and their tubular corollas partly flattened like rays. Centaurea, XIII
Rays none, and marginal flowers like the others; scales of the involucre not prickly. Antennaria, III
Rays none and marginal flowers like the others; scales of the involucre overlapping in many rows, prickly-pointed. Cirsium, XII

II. LIGULIFLORÆ

Corollas all strap-shaped.
Corollas blue (rarely pinkish); akenes not beaked. Cichorium, XIV
Corollas blue; akenes beaked. Lactuca, XIX
Corollas yellow.
(*a*) Akenes truncate; pappus double, of chaff and bristles. Krigia, XV
(*b*) Akenes columnar; pappus of tawny, rough bristles; stem scape-like. Hieracium, XXII
(*c*) Akenes spindle-shaped, not beaked; pappus of plumed bristles. Leontodon, XVI

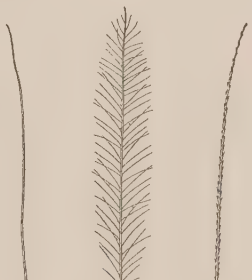


FIG. 31. Types of pappus hairs

A, smooth hair of dandelion; *B*, plumose hair of fall dandelion; *C*, rough or barbed hair of hawkweed. (7 times natural size)

(*d*) Akenes ovoid to spindle-shaped, long-beaked, 4–5-ribbed; pappus white, soft, and abundant. Taraxacum, XVII

(*e*) Akenes nearly as in XVII; pappus tawny. Pyrrhopappus, XXI

(*f*) Akenes not flattened, with or without beak, 10-ribbed; pappus of abundant stiff, hair-like white bristles. Agoseris, XX

(*g*) Akenes flattened, beaked; pappus soft, white, the hairs soon falling off; leafy-stemmed herbs. Lactuca, XIX

(*h*) Akenes flattened, not beaked; pappus abundant, soft, white; leafy-stemmed, spiny-leaved herbs. Sonchus, XVIII

I. TUBULIFLORÆ

I. BELLIS L.

Small herbs. Leaves usually all basal, petioled. Heads solitary, disk yellow, ray flowers white or pink; involucre bell-shaped; bracts in 1 or 2 rows, green; receptacle conical. Ray flowers many, in a single row, pistillate; disk flowers tubular, bisexual, 4–5-toothed; forks of the style short, thick, tipped by roughened cones. Fruit flattened, obovate; pappus wanting.

1. **B. integrifolia** Michx. American Daisy. A branching annual or biennial herb, 4–12 in. high. Upper leaves lanceolate or oblong, the lower ones obovate-spatulate. Heads borne on slender peduncles; rays violet-purple. Prairies, especially S.W.

2. **B. perennis** L. English Daisy, Scotch Daisy. An apparently stemless perennial. Leaves obovate-spatulate, smooth or hairy. Heads $\frac{3}{4}$–1 in. in diameter, very pretty, the rays delicate. Cultivated from Europe.

II. ERIGERON L.

Herbs. Leaves usually sessile. Heads many-flowered, flat or nearly hemispherical, the rays numerous, narrow, pistillate. Scales of the involucre narrow and overlapping but little. Akenes flattish, crowned with a single row of hair-like bristles, or sometimes with shorter bristles or scales outside these. Disk yellow, rays white, pinkish, or purple.

B. Fl. species 5 (*Leptilon*).

1. E. pulchellus Michx. Robin's Plantain. Perennial; soft-hairy; stems sometimes throwing out offsets from the base; simple, erect, 1–2 ft. high. Basal leaves obovate-obtuse, somewhat serrate; stem leaves few, lance-oblong, acute, clasping. Heads rather large, 1–9, on long peduncles, with 50–60 long, rather broad, bluish-purple or reddish-purple rays. Thickets and moist banks.

2. E. philadelphicus L. Perennial; rather hairy; stems slender, about 2 ft. high. Basal leaves spatulate and toothed; stem leaves usually entire and strongly clasping, sometimes with a heart-shaped or eared base. Heads several, small, long-petioled; rays exceedingly numerous, thread-like, reddish-purple or flesh color. In damp soil.

3. E. annuus Pers. Common Fleabane. Annual or biennial. Stem grooved and stout, branching, 2–5 ft. high, with scattered hairs. Lowest leaves petioled, ovate, coarsely toothed; those higher up the stem successively narrower, sessile. Heads in a large, loose corymb; rays short, white or purplish. Fields and waste ground.

4. E. ramosus BSP. Daisy Fleabane. Annual or biennial. Considerably resembling the preceding species, but with entire leaves, smaller and less branched stem, smaller heads, and longer rays. Fields and pastures.

5. E. canadensis L. Horseweed, Butterweed, Colt's Tail. Annual; stem erect, 1–5 ft. high. Leaves linear, those of the stem entire. Heads very numerous and small, panicled; the white rays hardly longer than the pappus. A common and troublesome weed.

III. ANTENNARIA Gaertn.

Perennial woolly herbs. Leaves partly basal, the stem leaves alternate. Heads small, many-flowered, dicœcious; the flowers all tubular. Involucre of thin, dry, white or colored bracts, imbricated in several series. Receptacle convex or flat, without chaff. Pistillate flowers with very slender tubular corollas and abundant pappus of hair-like, naked bristles, somewhat united at the base; pappus of the sterile flowers thickened and club-shaped at the tips. Akenes small, cylindrical or flattish.

1. A. Parlinii Fernald. Stolons ascending, leafy throughout; stems rather stout, at length 12–20 in. high, they and the stem leaves more or less downy with purplish glandular hairs. Basal leaves and those at the tips of the stolons at length smooth and bright green above; lower stem leaves abundant, oblong or narrower, obtuse or nearly so. Heads corymbed. Style at length crimson. Rich soil, frequently in open woods.

2. A. plantaginifolia Richards. Common Everlasting, Pussy's Toes. Stolons ascending, leafy throughout; stems slender, 4–20 in. high. Basal leaves and those at the tips of the stolons pale and very downy or covered with cobweb-like hairs above; stem leaves scattered, lanceolate, taper-pointed. Heads more or less closely corymbed. Styles crimson. In dry soil, very common.

3. A. solitaria Rydb. Stolons when well developed procumbent, leafy only at the tip; stems 2–8 in. high. Basal leaves obovate-spatulate, densely downy beneath, covered with cobweb-like hairs above, but becoming smoothish; stem leaves few, small, lying close to the stem. Heads solitary. Styles crimson. Rich wooded hillsides, central and south central states.

IV. RUDBECKIA L.

Perennial or biennial. Leaves alternate, entire or lobed. Heads radiate, long-peduncled, many-flowered; bracts imbricated in 2–3 series, spreading; receptacle convex or long-conical, with concave, chaffy scales. Ray flowers yellow, neutral; disk flowers purple to brown, bisexual. Akenes smooth, 4-angled, truncate. Pappus a few short teeth or wanting.*

1. R. hirta L. Cone Flower, Black-Eyed Susan. Annual or biennial; stem erect, rough-hairy, simple or branched, 2–3 ft. high. Leaves lanceolate to oblong, thick, obscurely serrate, rough-hairy, 3-ribbed; the lower petioled, the upper sessile. Heads few, long-peduncled; bracts rough-hairy, spreading. Ray flowers 10–20, orange-yellow; disk flowers purplish-brown. Chaff acute, hairy at the apex. Pappus none. On dry, open ground.

V. LEPACHYS Raf. (RATIBIDA)

Perennial herbs. Leaves alternate, pinnately divided. Heads radiate, long-peduncled, many-flowered; bracts few, small, spreading. Receptacle columnar or slender, the chaff of concave truncate scales. Ray flowers yellow or with brown at the base, neutral; disk usually grayish.

1. L. pinnata T. & G. Gray Cone Flower. Stem slender, branching, often 4 ft. or more high, gray with minute close-lying hairs. Leaves mostly large, pinnately 3–7-divided; the basal ones with long petioles, stem leaves sessile, the uppermost small. Disk oblong, gray or at length brown. Rays 4–10, light yellow, drooping, often 2 in. long. In dry prairie soil and borders of thickets.

2. L. columnaris T. & G. Prairie Cone Flower. Stem rough-hairy, slender, usually branching from the base, 1–2 ft. high. Leaves pinnately divided into oblong to narrowly linear segments. Disk columnar, sometimes more than 1 in. long. Rays 4–10, drooping, yellow or partly or entirely brownish-purple, as long as or somewhat shorter than the disk. On dry prairies, especially W. and S.W.

VI. COREOPSIS L.

Annual or perennial herbs. Leaves opposite or the upper alternate, entire or pinnately divided. Heads radiate, solitary or corymbed, many-flowered; bracts in 2 rows of about 8 each, the inner membranaceous and appressed, the outer narrower and spreading; receptacle chaffy. Ray flowers neutral; disk flowers tubular, bisexual. Akenes compressed, oval to oblong, often winged. Pappus of 2 scales or bristles, or wanting.*

1. C. tinctoria Nutt. Garden Coreopsis. Annual; stem erect, smooth, branched, 2–3 ft. high. Leaves 2–3 times pinnately divided, the divisions linear; lower leaves petioled, the upper often sessile and entire. Heads 1–1½ in. wide, on slender peduncles; inner bracts brown with scarious margins, outer bracts very short. Ray flowers about 8, yellow with a brown base, 3-lobed at the apex. Akenes linear. Pappus minute or none. Common in gardens.*

2. C. lanceolata L. Tickseed. Perennial; stem slender, erect or ascending, smooth or slightly downy below, simple, 9–15 in. high. Leaves opposite, the lower spatulate to elliptical, sometimes lobed, on long, hairy-fringed petioles; the upper lanceolate, sessile. Heads few, on long peduncles; bracts ovate-lanceolate, the outer narrower. Ray flowers 6–10; rays 3–5-lobed, bright yellow. Akenes oval, broadly winged, warty. Pappus of 2 teeth. On rich, dry soil, S. and E.*

3. C. grandiflora Hogg. Large-Flowered Tickseed. Usually perennial; stem smooth, commonly branched above, 1–3 ft. high. Most of the leaves once or twice pinnately parted, the lower sometimes entire, on slender petioles; segments of most of the stem leaves linear or thread-like. Heads usually several, 1½–2 in. in diameter, on long peduncles; outer bracts lanceolate, narrower and shorter than the inner ones. Rays 6–10, yellow. Akenes oblong, with broad wings when ripe. In moist soil, especially S.W.

4. C. auriculata L. Running Tickseed. Perennial; stem ascending or decumbent, weak, smooth, nearly simple, 6–15 in. long. Leaves ovate to oval, entire or with 2–4 small and rounded lobes at the base, downy, long petioled. Heads 1–1½ in. wide, few or single; outer bracts narrower than the inner. Rays 6–10, mostly 4-toothed

at the apex; chaff as long as the flowers. Akenes oblong, the wings narrow and thickened; pappus of 2 minute teeth. In rich woods.*

5. **C. palmata** Nutt. STIFF TICKSEED. Perennial; stem stiff, smooth, little or not at all branched, very leafy, 1–3 ft. high. Leaves 3-cleft, broadly wedge-shaped, stiff; the lobes linear-oblong, middle one often 3-lobed. Heads on short peduncles, few or solitary, 1¼–2 in. in diameter; bracts of the outer series narrower than the inner ones, slightly shorter. Rays 6–10, bright yellow, broad, usually 3-toothed. Akenes oblong, with narrow wings. Dry prairies and thickets W.

6. **C. verticillata** L. Perennial; stem smooth, stiff, slender, branching freely, leafy, 1–2 ft. high. Leaves divided into 3 sessile leaflets, the latter once or twice pinnately parted into narrowly linear or thread-like divisions. Heads 1¼–1½ in. in diameter; outer bracts much narrower than the inner ones. Rays 6–10, yellow. Akenes oblong, with narrow wings. In dry or moist soil, sometimes cultivated.

VII. HELENIUM L.

Annual or perennial. Leaves alternate, forming wings on the stem. Heads radiate, peduncled, many-flowered; bracts in 2 series, the outer linear and spreading, the inner few and scale-like; receptacle naked, convex or oblong. Ray flowers pistillate and fertile, or neutral, the rays wedge-shaped, 3–5-lobed; disk flowers bisexual, tubular, 4–5-lobed. Akenes top-shaped, hairy, ribbed; pappus of 4–5 entire, toothed or awned scales.*

1. **H. nudiflorum** Nutt. SNEEZEWEED. Perennial; stem slender, erect, downy, branched above, 1–2 ft. high. Leaves lanceolate, entire or slightly toothed, the lower petioled, the upper sessile. Heads numerous. Ray flowers 10–15, neutral, yellow or yellow and brown; disk flowers purple. Akenes hairy on the ribs; pappus of ovate, minutely toothed, awned scales. Common on river banks S.*

VIII. ACHILLEA L.

Perennial. Leaves alternate, pinnately divided. Heads with ray flowers in a terminal corymb; involucral bracts imbricated in several series, the outer shorter; receptacle chaffy. Ray flowers white or pink, pistillate and fertile; disk flowers bisexual, tubular, 5-lobed. Akenes oblong, compressed, slightly margined; pappus none.*

1. **A. Millefolium** L. YARROW. Stems often clustered, erect from a creeping rootstock, simple, downy or woolly, 1–2 ft. high. Leaves

lanceolate or oblong, the segments finely cut and divided, smooth or downy, the lower petioled, the upper sessile. Heads small, numerous, in flat-topped corymbs; bracts downy. Ray flowers 4–5, white or pink, rays 3-lobed at the apex. Common in old fields.*

IX. ANTHEMIS L.

Aromatic or ill-scented herbs. Leaves finely pinnately divided. Heads many-flowered, with ray flowers. Rays pistillate or neutral. Involucre of many small, dry, close-pressed scales. Akenes nearly cylindrical, generally ribbed, barely crowned or naked at the summit.

1. A. Cotula L. Mayweed, Dog Fennel. Leaves irregularly cut into very many narrow segments. Heads small, produced all summer. Disk yellow. Rays rather short, white, neutral. A low, offensive-smelling annual weed, by roadsides and in barnyards.

2. A. arvensis L. Field Chamomile. Annual or biennial. Resembling *A. Cotula*, but without offensive smell. Leaves less finely once or twice pinnately parted. In fields and waste ground. Naturalized from Europe.

X. CHRYSANTHEMUM L.

Perennials, with toothed, pinnately cut or divided leaves. Heads nearly as in *Anthemis*, except that the ray flowers are pistillate.

1. C. Leucanthemum L. Oxeye Daisy, Whiteweed, Bull's-Eye, Sheriff Pink. Stem erect, unbranched or nearly so, 1–2 ft. high. Basal leaves oblong-spatulate, petioled, deeply and irregularly toothed; stem leaves sessile and clasping, toothed and cut, the uppermost ones shading off into bracts. Heads terminal and solitary, large and showy, with a yellow disk and many white rays. A troublesome but handsome perennial weed. Naturalized from Europe, chiefly E.

2. C. frutescens L. Marguerite. Erect, branching, perennial, woody below, smooth, and with a pale bloom. Divisions of the leaves linear, with the uppermost leaves often merely 3-cleft bracts. Heads long-peduncled, showy, with a yellow disk and large, spreading white rays. Cultivated in greenhouses. From the Canary Islands.

XI. SENECIO L.

Annual or perennial; stems often hollow. Leaves alternate, entire or pinnately divided. Heads with or without rays, in terminal corymbs; bracts mostly in a single row, often with a

few shorter ones at the base; receptacle naked or pitted. Ray flowers yellow or orange, pistillate and fertile when present; disk flowers tubular, bisexual. Akenes cylindrical or compressed, not beaked or winged, 5-10-ribbed, downy; pappus of numerous slender white hairs.*

1. S. glabellus Poir. BUTTERWEED. Annual; stem erect, ridged, hollow, often woolly when young and becoming smooth with age, branched above, 1–3 ft. high. Leaves lyrate-pinnatifid, thin, the lower petioled, the upper sessile. Heads radiate in a terminal corymb; bracts linear, acute. Ray flowers about 12, yellow. Akenes slightly rough-hairy on the angles; pappus rough, longer than the involucre. Common on low ground.*

2. S. aureus L. GOLDEN RAGWEED. Perennial; stems often tufted, erect, slender, woolly when young, branched above, 18–30 in. high. Lower leaves broadly ovate, obtuse at the apex, heart-shaped at the base, crenate, long-petioled; stem leaves lanceolate and often pinnatifid, the upper small and sessile. Heads radiate, corymbed, on slender peduncles. Ray flowers 8–12, bright yellow. Akenes smooth. In wet soil; very variable.*

3. S. tomentosus Michx. WOOLLY RAGWEED. Perennial; woolly throughout; stem stout, erect, mostly simple, 2–3 ft. high. Lower leaves ovate to oblong, crenate or entire, obtuse, long-petioled; stem leaves few, elliptical to oblanceolate, serrate or toothed, acute, sessile. Heads radiate, $\frac{3}{4}$ in. wide, on slender peduncles; bracts narrow, becoming smooth. Ray flowers 12–15, yellow. Akenes hairy. In damp soil.*

XII. CIRSIUM Hill. (CARDUUS)

Biennial or perennial; stem erect, simple or branched. Leaves alternate, prickly, often forming wings on the stem. Heads discoid, terminal and solitary or corymbed, many-flowered; bracts overlapping in many series, the outer shorter, usually spine-pointed; receptacle bristly. Corollas purplish or nearly white, the tube slender, deeply 5-cleft. Akenes oblong, 4-angled, smooth or ribbed; pappus of numerous simple or plumose bristles. [Most of our commoner species blossom in the late summer and autumn.]*

1. C. spinosissimum Scop. YELLOW THISTLE. Biennial or perennial; stem erect, stout, woolly when young, becoming smooth, often purple, branched, 1–3 ft. high. Leaves pinnately cut, with very spiny teeth, mostly sessile and clasping, smooth and green on both sides. Heads

large, surrounded by a whorl of linear-oblong, comb-like leaves; involucral bracts linear, ciliate, not spine-tipped. Flowers purple or yellowish. On sandy soil E. and S.*

2. **C. virginianum** Michx. Early Wood Thistle. Stem woolly, slender, little or not at all branched, 1–3 ft. high. Leaves lanceolate, green above, covered beneath with dense white wool, the margins beset with prickly bristles, entire or sinuate-lobed, the lower ones sometimes pinnately cut into triangular-lanceolate lobes. Heads small, purple, on long leafless peduncles; outer scales of the involucre merely bristle-pointed. In dry woods and thickets.

XIII. CENTAUREA L.

Herbs. Leaves entire or cut, often spiny-toothed. Heads single; involucre ovoid or globose; bracts closely overlapping, often fringed, dry and membranaceous. Corollas all tubular, oblique or 2-lipped, inflated above; the outer ones usually larger and neutral, the inner flowers bisexual; lobes 5, slender. Akenes flattened; pappus hairs short, slender, rough.

1. **Cyanus** L. Bachelor's Button. Stem erect, slender, grooved, 1–2 ft. high, somewhat branched. Leaves acute, sessile, narrow, entire or few-lobed. Peduncles covered with cottony wool. Heads ½–1 in. in diameter, cobwebby. Ray-like flowers few, large, bright blue or pink; those of the disk smaller. Cultivated from Europe and escaped from gardens.

2. **C. americana** Nutt. Prairie Star Thistle. Annual; stem stout, little or not at all branched, 2–6 ft. high. Leaves entire or minutely toothed, the basal and lower ones spatulate or oblong, petioled, the upper narrower, sessile and mucronate. Heads solitary at the summit of the stem or tips of the branches; involucre nearly hemispherical, the bracts ovate or lanceolate, with comb-like appendages. Flowers pink or purple, the marginal ones ray-like. In dry plains, especially S.W.

II. LIGULIFLORÆ

XIV. CICHORIUM L.

Perennial herbs with spreading branches; juice milky. Leaves radical and alternate, toothed or pinnately cut. Heads axillary; involucre cylindrical; bracts in 2 rows, the inner row erect, united at the base, the outer shorter; receptacle flattish. Corollas blue, pale pink, or yellow. Upper part of the style and its slender arms hairy. Akenes crowded on the

hardened receptacle, firmly covered by the stiff involucre, obovoid or top-shaped, not beaked; pappus 1 or 2 rows of short scales.

1. C. Intybus L. Chicory, Blue Dandelion, Blue Sailors. Root very long, stout, and fleshy; stem 1–3 ft. high, angled and grooved; branches straight and stiff. Basal leaves and lower stem leaves runcinate; upper stem leaves oblong or lanceolate, clasping, those of the branches reduced to bracts. Flowers very showy, usually bright blue, rarely pinkish-white. Introduced from Europe; a troublesome weed in grass lands and common in waste places, particularly in New England.

XV. KRIGIA Schreber. (ADOPOGON)

Small, annual or perennial herbs. Leaves mostly basal, toothed or lyrate. Heads several–many-flowered; scales of the involucre about 2-rowed, thin. Akenes short, truncate; pappus in 2 rows, the outer one of thin, blunt, chaffy scales, the inner one of slender bristles. Corollas yellow.

1. K. virginica Willd. Annual; scapes usually 2–5 from one root, slender. Leaves mostly lyrate, smooth and with a bloom, the earlier ones rounded or spatulate. Scales of the involucre linear-lanceolate, nearly equal, spreading. Akenes top-shaped, reddish-brown, crowned with 5 wedge-obovate scales and 5 rough white bristles.

2. K. Dandelion Nutt. Perennial, from slender tuber-bearing roots; scapes leafless, 6–18 in. high. Leaves entire or nearly so, varying from spatulate-oblong to linear-lanceolate. Akenes more slender than in No. 1; pappus consisting of 10–15 small, oblong, chaffy scales, and 15–20 bristles. In moist ground, especially S.

3. K. amplexicaulis Nutt. Stem 12–18 in. high, often 2–3 from the same root, mostly 2-forked or 3-forked at the summit. Basal leaves 3–6 in. long, lanceolate, entire, toothed or rarely pinnately cut, clasping at the base; stem leaves 1–3. Akenes and pappus about as in No. 2. Moist banks.

XVI. LEONTODON L.

Perennial, scape-bearing herbs; juice milky. Leaves all basal, toothed or pinnatifid, often runcinate. Heads on simple or branched scapes, yellow; bracts of the involucre many, in several rows, the anther smaller; receptacle flat, naked. Arms of the style linear, obtuse, hairy. Akenes cylindrical, grooved, transversely wrinkled; beak short; pappus hairs stiff, in 1 or 2 rows.

1. L. autumnalis L. Scape usually branching, 5–15 in. high, bracted; peduncles enlarged above. Rootstock truncate. Heads 1½–1 in. or more in diameter; involucre top-shaped or bell-shaped. Pappus of a single row of tawny hairs. Fields and roadsides, especially N.E. Naturalized from Europe.

XVII. TARAXACUM Haller

Stemless perennial or biennial herbs. Leaves in a flattish tuft, pinnately cut or runcinate. Head many-flowered, large, solitary, yellow, borne on a hollow scape, which is short at first but lengthens after flowering. Involucre composed of a single row of long, erect inner scales, and a set of much shorter ones outside and at the base of the former ones. Akenes cylindrical or spindle-shaped, with 4–5 rough ribs, the apex tapering into a bristle-like beak which bears a short, broadly conical tuft of soft white hairs.

1. T. officinale Weber. DANDELION. Outer involucre reflexed; inner involucre closing over the head, after the flowers are withered, and remaining shut for some days, then opening and allowing the akenes to form a globular head. Root stout, bitter, medicinal. Young leaves eaten as a pot-herb ("greens") in spring — the plant often cultivated for the leaves by market-gardeners.

XVIII. SONCHUS L.

Annual or perennial. Leaves mostly toothed or pinnately cut, prickly margined. Heads in corymbs or panicles; bracts in several series, the outer shorter; receptacle naked. Flowers yellow, rays truncate, 5-toothed at the apex. Akenes oval to oblong, compressed, ribbed, truncate at the apex; pappus of numerous soft white hairs.*

1. S. oleraceus L. Sow THISTLE. Annual; stem erect, branched, smooth, 2–6 ft. high. Leaves spiny-toothed, the lower long-petioled, very irregularly cut or pinnatifid, the upper clasping by an eared base. Involucre downy when young. Akenes channeled and transversely wrinkled. In waste places on very rich soil.*

2. S. asper Vill. SPINY SOW THISTLE. Annual; stem erect, smooth, branched but little, 2–6 ft. high. Leaves undivided, spatulate to oblanceolate, fringed with spiny teeth; the lower narrowed into a petiole, the upper clasping by an eared base, the ears rounded.

Heads numerous; involucre glabrous. Akenes flattened, margined, 3-nerved on each side, smooth. In waste places.*

XIX. LACTUCA L.

Annual, biennial, or perennial; stems leafy. Leaves entire to pinnately cut. Heads paniculed; involucre cylindrical; bracts unequal, overlapping in 2 or more rows, the outer shorter; receptacle naked. Flowers blue, yellow, or white; rays truncate, 5-toothed at the apex. Akenes compressed, ribbed, the apex contracted into a slender beak, which is enlarged into a disk bearing the soft, hairy, white or tawny pappus.*

1. **L. canadensis** L. Wild Lettuce. Biennial; stem erect, smooth, hollow, branched above, 3–10 ft. high. Leaves lanceolate to spatulate, pale beneath, the lower petioled and pinnately cut, the upper sessile, clasping, and nearly entire. Heads numerous, about 20-flowered; flowers yellow. Akenes oval, flat, 1-ribbed on each side, minutely roughened, about as long as the beak; pappus white. In waste places.*

2. **L. acuminata** Gray. Blue Lettuce. Stem very leafy, smooth, paniculately branched above, 3–6 ft. high. Leaves ovate to lanceolate, taper-pointed, often hairy beneath; the lower on winged petioles and often sinuate-lobed, the upper sessile. Heads racemed, on divergent and bracted peduncles; flowers blue. Akenes slightly compressed, beak very short; pappus white. In waste places.*

XX. AGOSERIS Raf.

Herbs, usually appearing stemless. Basal leaves tufted, usually sessile. Head solitary, large, yellow or rarely purple, on a naked or bracted scape; bracts of the involucre overlapping in 2 or 3 rows; receptacle flat, naked or pitted. Akenes smooth, 10-ribbed, with or without a beak; pappus of abundant slender white bristles.

B. Fl. species 1 (*Nothocalais*).

1. **A. cuspidata** Steud. Scape 1 ft. or more high. Leaves lanceolate, taper-pointed, woolly-margined. Involucral scales lanceolate, sharp-pointed. Akenes beakless. Prairies and plains W.

2. **A. glauca** Steud. Scape stout, 1–2 ft. high. Leaves varying from linear to oblong, entire, dentate or pinnately cut. Heads 1–2 in. in diameter. Akenes beaked. Plains W.

XXI. PYRRHOPAPPUS DC. (SITILIAS)

Annual or biennial; stem erect, leafy below, nearly naked above, smooth. Leaves oblong, toothed or pinnatifid. Heads large, long-peduncled; involucre cylindrical or spreading, the inner row of bracts erect, united at the base, the outer rows shorter and spreading; receptacle naked. Flowers yellow; rays truncate, 5-toothed at the apex. Akenes oblong, 5-ribbed, narrowed above into a long and slender beak; pappus soft, tawny, with a short, soft-hairy ring at the base.*

1. P. carolinianus DC. False Dandelion. Annual or biennial; stem glabrous, furrowed, branched above, 2–3 ft. high. Lower leaves lanceolate to oblong, entire, toothed or pinnatifid, narrowed into a margined petiole; the upper sessile, bract-like, entire. Heads few, long-peduncled; peduncles and involucre sometimes finely downy; inner bracts calloused at the apex, the outer awl-shaped and spreading. Akenes much shorter than the thread-like beak. Common in fields.*

XXII. HIERACIUM L.

Perennial herbs, often covered with glandular or star-shaped hairs; juice milky. Leaves alternate. Heads solitary, or in corymbs or panicles; bracts of the involucre many, overlapping, unequal; receptacle flattish, naked, pitted. Corollas yellow, rarely orange. Arms of the style slender and upper part of the style hairy; akenes angled or grooved, not beaked. Pappus hairs in a single row, simple, stiff, tawny or brownish, brittle. [Most of our commoner species bloom in the late summer or autumn.]

1. H. aurantiacum L. Orange Hieracium, Devil's Paint Brush. Stem leafless or occasionally with 1 or 2 small sessile leaves, clothed with long hairs. Basal leaves oblanceolate, hairy, $2\frac{1}{2}$–6 in. long. Scapes 8–24 in. high. Heads corymbed, about $\frac{3}{4}$ in. in diameter, orange-red. A common weed, naturalized from Europe.

2. H. venosum L. Rattlesnake Weed. Stem scape-like, usually leafless or nearly so, smooth, 1–2 ft. high. Basal leaves 2–5 in. long, obovate or ovate-oblong, generally purple-veined. Heads rather large, yellow, in a loose panicled corymb. Dry hills and roadsides, and in pine woods E.

GLOSSARY

OF TECHNICAL TERMS USED MAINLY IN THE FLORA

Abortive, imperfectly developed.

Actinomorphic, having radial symmetry.

Adventive, partially naturalized.

Appressed, lying flat throughout its length, used of such parts as bracts.

Awl-shaped, narrow and tapering to a point.

Awned, having a bristle-like appendage.

Awnless, not awned.

Bisexual, having both stamens and pistils in the same flower.

Caducous, falling away very early.

Capitate: (1) having a round head like the stigma of a primrose; (2) growing in heads.

Carpellary, relating to a carpel.

Chaff, small membranous scales, such as are found on disks of *Compositæ*.

Ciliate, having the margins fringed with hairs or bristles.

Clasping, partly surrounding the stem; said of the bases of leaves.

Claw, the narrowed base of a petal.

Cleft, cut halfway down.

Coated (bulbs), those with scales which completely cover them, as in the onion.

Cone, the fruit of pines, etc., with ovule-bearing scales.

Connate, united; said of opposite leaves which appear as if grown together at their bases.

Convolute, rolled up lengthwise.

Convolute

Cordate, heart-shaped.

Corm, a bulb-like, fleshy stem or base of a stem.

Crown, an inner appendage to a petal or to the throat of the corolla.

Deciduous, falling as petals do after blossoming, or as leaves of most trees except evergreens do.

Declined, directed obliquely.

Decumbent, reclining, but with the summit somewhat erect.

Dehiscent, splitting into definite parts.

Diffuse, spreading widely or loosely.

Dimorphous, occurring under two forms, as in flowers with long and with short styles.

Disk: (1) an outgrowth of the receptacle within the calyx or within the corolla and stamens; (2) the central part of the head (all but the rays) in *Compositæ*.

Dissected, deeply divided or cut into many segments.

Drupe, a stone fruit such as a peach or a plum.

Equitant, leaves astride of those within them, thus appearing in a cross section like the diagram, <<<.

Even-pinnate, abruptly pinnate, i.e. with no leaflet at the end.

Fascicle, a close cluster or bundle of flowers, leaves, stems, or roots.

Fertile, capable of producing fruit; fertile flowers, those which have pistils.

Filiform, thread-shaped.

Fleshy, succulent, thick and full of sap.

Funiculus, the little stalk which connects a seed or ovule with the placenta.

Gland: (1) a structure which secretes something, as the knobs on the hairs of sundew; (2) any knob or swelling.

Glume, one of the two sterile, chaffy bracts at the base of a grass spikelet.

Herbaceous, with no stem aboveground which lives through the winter, not woody or shrubby.

Imbricate, overlapping, as the segments of some perianths in the bud. At least one segment must be wholly outside and one wholly inside.

Imbricate

Indefinite, too many to be easily counted.

Indehiscent, not splitting open regularly.

Introduced, term applied to plants purposely brought into a region by man.

Involucrate, provided with an involucre.

Keel, the two anterior and united petals of a papilionaceous corolla.

Key, a winged fruit like that of the ash or maple.

Limb, the border or spreading part of a gamopetalous calyx or corolla.

Lobed, having divisions, especially rounded ones.

Lodicule, one of the very minute scales immediately beneath each flower in a grass spikelet.

Naturalized, term applied to plants not natives of a region but thoroughly established there in a wild condition.

Nerved, having simple or unbranched veins or slender ribs.

Ob- (in composition), signifies inversely; as, obcordate, inversely heart-shaped.

Odd-pinnate, pinnate with a single leaflet at the end of the midrib.

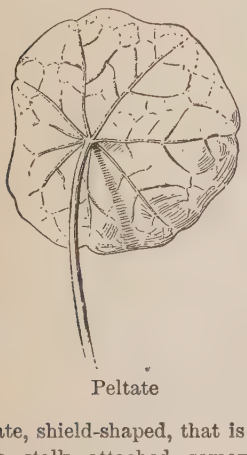
Palate, a projection in the throat of a corolla.

Palet, one of the bracts which subtend the flowers in a grass spikelet.

Papilionaceous, butterfly-shaped, like the corolla of the sweet pea.

Papillose, covered with papillæ or minute projections, like the human tongue.

Pappus, tufts of hair or other objects, representing the limb of the calyx in *Compositæ* (Fig. 30).



Peltate

Peltate, shield-shaped, that is with the stalk attached somewhere within the circumference of the leaf or other organ.

Perfoliate, with the stem apparently growing up through a leaf, as in some honeysuckles.

Persistent, not deciduous.

Pinnatifid, pinnately cleft.

Pistillate, having pistils but not stamens.

Plumose, feathered, as the pappus of thistles (Fig. 31).

Pubescent, clothed with soft hair, downy.

Punctate, marked with dots, depressions, or translucent glands.

Reflexed, bent or turned abruptly downward or backward.

Root parasite, a plant parasitic on the roots of another.

Sagittate, arrow-shaped.

Scape, a leafless flower stalk arising from the ground, as in the dandelion and cyclamen.

Scarious, thin, dry, and membranous, not green.

Sessile, without a stalk.

Simple (stem), unbranched.

Spadix, a spike with a fleshy axis, like that of the Indian turnip or the "calla."

Spathe, a large bract which incloses a flower cluster, often a spadix.

Staminate, having stamens only.

Standard, the posterior petal of a papilionaceous corolla.

Sterile: (1) barren, as a flower without a pistil or an antherless stamen; (2) staminate or male, said of flowers.

Striate, marked with fine longitudinal parallel lines.

Sub- (in composition), somewhat, as subglobose.

Subtend, to extend beneath as a bract in the axil of which a flower is borne.

Succulent, fleshy or juicy.

Three-ranked, with three vertical rows on a stem or axis.

Throat, the top of the tubular part of a sympetalous corolla.

Truncate, appearing as if cut squarely off, as the leaves of the tulip tree.

Two-lipped

Tubercled, covered with warty growths.

Tubercular, having tubercles, or like a tubercle.

Utricle

Two-lipped, having the limb of the calyx or corolla divided into two lip-like portions, as in the *Labiatæ*.

Two-ranked, with two vertical rows on a stem or axis.

Unisexual, having in each flower only stamens or only pistils, not both.

Utricle, a small bladdery ovary wall.

Versatile, turning freely on its support, as an anther on its filament.

Whorled, arranged in a circle around an axis, as the leaves of some lilies.

Wings, the side petals of a papilionaceous flower.

Zygomorphic

Zygomorphic, having bilateral symmetry, as the corollas of many *Leguminosæ*.

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All names in italics are synonyms, — the preferred names are in Roman type

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